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Survey of the Machine Tool Export Trade

Our Exports Are Increasing, but German Tools Now Lead in All Foreign Markets Except the United Kingdom—Some Undeveloped Markets

BY G. R. WOODS*

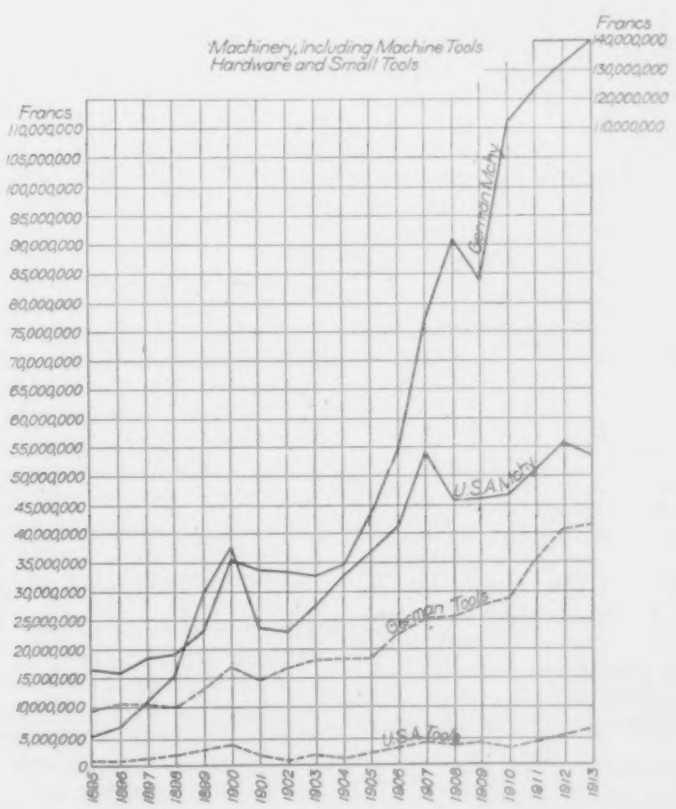
A recent issue of *The Iron Age* contained an article by Carl Gebuhr under the title "Exporting Machine Tools," in which American machine tool builders were warned that their export trade was threatened by European competition. Our manufacturers were not only admonished to watch their export business more carefully, but were also urged to improve their selling methods abroad.

While most of us probably agree with Mr. Gebuhr and believe his admonitions and recommendations to be timely and well founded, there was one statement in his article to which there can be no hearty concurrence by those who are in close touch with the exportation of American machine tools. The statement by Mr. Gebuhr to which exception is taken, is as follows:

"Something not generally known, but easily proved by statistics, is that the exporting of American machine tools to Europe has been on the decline for the past few years and the time is coming when manufacturers will encounter still greater difficulty in finding a market on the other side, no matter what kind of machines they make."

In view of the fact that Europe purchased 75 per cent. of the machine tools exported by America in 1913, a statement that this important market is slipping away from us should be investigated and the findings of such an investigation should be brought to the attention of all manufacturers who are seriously considering their export sales. Accordingly, a brief review will be given of our machine tool business in Europe, as well as in the other continents, so that manufacturers themselves may decide just what statistics do show and determine whether our exports of metal working machinery have been decreasing in Europe or elsewhere.

We will first consider the value of our machine tool exports throughout the world. The figures in Table 1 speak for themselves, and show a steady increase from 1909 to date. The total of over $16,000,000 in 1913 represents 0.64 per cent. of the export business of the United States for that year when our export trade amounted to $2,500,000,000.



Imports Into France from Germany and the United States

Table 1—Exports of Machine Tools by United States

1907	$9,369,056
1908	8,696,235
1909	3,640,034
1910	5,975,503
1911	9,626,965
1912	12,151,819
1913	16,097,315

Our machine tool exports for 1913, as shown above, represent a 33 1/3 per cent. increase over the total for 1912, and a 75 per cent. increase over the figures for 1907, our best previous year.

In Table 2, the distribution of our machine tool exports for 1913, is shown by continents. The same table also shows the distribution of Germany's machine tool exports for the same period. Three-fourths of the machine tools exported by the United States were shipped to Europe and one-eighth to Canada. Of Germany's total, 91 per cent. was sold in Europe.

Table 2—Exports of Machine Tools in 1913 by Germany and the United States

	United States	Germany
Europe	$12,268,677	$17,992,539
North America	2,554,420	453,568
South America	571,919	842,457
Asia	202,620	364,903
Australia	460,825	54,978
Africa	37,031	.....
	$16,095,492	$19,708,445

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The preceding table discloses America's leadership over Germany in North America and in Australia, but a general conclusion cannot be drawn from this showing for our investigation indicates that in all parts of the British Empire American machine tools are preferred to those of German manufacture. In Asia and South America, however, the Germans are outdistancing their American competitors. This fact is of great significance for in the next 25 years the thriving and progressive nations in those continents will require large quantities of machine tools. Asia's purchases of machine tools will shortly total over $2,000,000, as the Chinese Government has recently placed an order with an American corporation, which amounted to approximately $1,500,000. This order will also mean that America will lead Germany in that field in the ensuing year.

In South America there is no reason for anticipating a loss of German leadership for it is well known that the Germans have been laying plans for some time in that territory and are in excellent position to obtain their share of the future machine tool business.

Notwithstanding the great possibilities for trade in Asia and in South America, it is quite likely that for some time Europe will maintain its supremacy as an export market for machine tools. It will probably not be many years before Russia alone will purchase from $8,000,000 to $10,000,000 worth of machine tools a year.

The importance of the European machine tool market to American, as well as German manufacturers, makes it expedient for us to ascertain just what proportion of each country's trade is obtained by Germany and by the United States. In Table 2 we found that approximately $12,000,000 worth of American tools were sold in Europe, and approximately $18,000,000 worth of German tools. Before going into greater detail, attention is invited to Table 3, in which is shown the machine tool exports from the United States to Europe for a number of years and an examination of this table will show that contrary to Mr. Gebuhr's statement, the sale of American machine tools in Europe is not decreasing.

Table 3—Exports of Machine Tools to Europe by the United States

1907	$8,423,471
1908	6,859,319
1909	2,853,605
1910	4,832,916
1911	7,622,951
1912	9,356,299
1913	12,268,677

This increase in the value of machine tools exported to Europe, while encouraging, should not permit any manufacturer to regard the situation with an air of complacency; for despite the increase in our shipments of machine tools to Europe, there is only one nation in that continent which buys more tools from us than from Germany, and that nation is the United Kingdom. In every other country the sales of German tools are far beyond our totals.

In Table 4, which follows, a comparative statement is given, showing by countries for the year 1913, the machine tool exports of Germany and of the United States.

Any comment on the situation in the various European countries should be prefaced by a reference to the important fact that Germany exports machine tools in order to keep that industry alive. Export sales are a matter of necessity to her manufacturers. Accordingly, they have co-operated in many ways to obtain control of the European machine tool market. It is competition of this nature

Table 4—Exports of Metal Working Machinery to Europe During 1913

	From Germany	From United States
Austria-Hungary	$3,047,775	$600,593
Belgium	1,798,104	786,679
Bulgaria	23,177	13
Denmark	288,634	84,753
Finland	66,420	24,947
France	3,208,936	1,936,908
Germany	.....	3,175,188
Greece	.....	2,310
Italy	1,545,043	437,910
Netherlands	981,249	260,893
Norway	192,962	79,366
Portugal	61,715	1,391
Roumania	143,374	110
Russia in Europe	3,524,251	1,088,751
Spain	405,687	109,624
Sweden	462,731	241,373
Switzerland	698,274	17,108
Turkey in Europe	37,460	3,105
United Kingdom	1,486,582	3,417,655
	$17,992,539	$12,268,677

that the American builder must face and it is doubtful if any plans to enlarge our trade abroad will be successful unless recognition is given to the spirit which impels the German manufacturers to fight so vigorously for business.

The leading machine tool buying nations of Europe, in the order of their importance, are Russia, United Kingdom, France and Austria-Hungary. As brought out in the preceding table, the German builders are obtaining the bulk of the business in all these important countries, with the exception of the United Kingdom. In Great Britain, the English manufacturers have fought hard to repel the German invasion and by appealing to the Britons to patronize home industries they have kept down the German invasion to $1,500,000. In important countries like France and Russia, however, the Germans have made wonderful progress. It is apparent that they are in the most advantageous position to increase their sales in all countries and particularly in Russia, where they are now strongly intrenched.

American manufacturers will appreciate what this German competition means if they study the chart which graphically shows the steady increase in the sale of German machine tools in France from 1895 to 1913. It was compiled from figures collected by the French customs authorities and appeared in Bulletin 121, issued by the American Chamber of Commerce, Paris, January, 1914.

American manufacturers have been surfeited with advice as to how they can best meet the German competition in Europe. No repetition of these recommendations will be mentioned here. It may not be amiss, however, to state some of the important advantages possessed by our German competitors which Americans must consider when planning their selling campaigns in Europe. Aside from the advantage of proximity and their ability to make quicker deliveries, in most cases, the duty on German machines is less than on American tools. Furthermore, there is effective co-operation by German machine tool builders in their work in foreign fields, particularly in Europe. Again, the German builders are in a position to take prospective customers to their factories to see the machines in process of construction. This is an important advantage as the average European buyer will spend the same amount of time investigating when he expects to purchase one tool as an American corporation would if it expected to buy one hundred.

Finally, it is reported that the German builders make a marked reduction in their export selling prices and have also agreed to give export orders preference in deliveries.

A steam turbine of no less than 32,000 hp. is to be built by the Westinghouse Machine Company for the Edison Electric Illuminating Company, Brooklyn.

Theory and Practice of Sherardizing

The Scientific Explanation of What the Process Really Is and the Practical Conditions Under Which It Should be Employed

BY SAMUEL TROOD*

One of the most serious problems confronting the world today is the enormous waste from the corrosion of iron and steel exposed to the elements. This represents a total loss that cannot be recovered.

The general subject of protection against corrosion of iron and steel may be subdivided into four main groups or classes, according to its application and methods of protection.

1. Introduction of other metals into the composition of the steel when made.
2. Mechanical covering of the steel, by paints, enamels, lacquers, inert metals, etc.
3. Passive condition of surface of iron or steel.
4. Covering with metals electropositive to iron.

This fourth group or class is the covering of iron by a coating which is electropositive to it. In other words, the protection to the iron is obtained at the expense of the protective coating, a sort of vicarious atonement. There are several metals that are electropositive to iron, such as antimony, arsenic, potassium, sodium and zinc. However, at the present time the only practical or commercial metal in this group is zinc.

This method is the one that is in general use, and the three ways of applying zinc to iron and steel are: electroplating or cold galvanizing; hot galvanizing, and dry galvanizing, or, as known by trade name, Sherardizing. It is proposed in this article to deal with the sherardizing process, as it is now coming into general use and is comparatively new and not so well defined and understood as the other methods.

What Remaining Parts of Dr. Trood's Article Will Cover:

- What kinds of products may best be treated by sherardizing
- What are the essentials in the way of plant equipment and the preparation and inspection of the materials to be treated
- What in particular must be watched to attain success
- What some typical sherardizing plants look like
- What are the advantages and disadvantages of the various protective processes
- What are the tests to prove the value of such protection

DRY GALVANIZING IN PREHISTORIC TIMES

A process practically identical to this was known in prehistoric times, although used for another purpose. At that time it was known that if certain copper tools and vessels were placed in the ground in certain localities and kept hot for a time by building fires over the place, then, on removal, it was seen that the copper had assumed a light yellow color and had become harder and more durable. They practically secured dry galvanizing, although it was not known that another metal was being alloyed with the copper. Also, in Greek history, according to Aristotle, the "bleaching of copper" was done by the same method.

The sherardizing process was discovered by accident. Commander H. V. Simpson, of the English navy, was detailed to work out a method of case hardening armor plate for battleships that would not infringe on the Harvey patents which were being used by nearly all governments for rendering armor plate shell proof. These experiments were being tried out in the laboratory of Sherard Cowper-Cowles, of London, a noted English metallurgist. A package of zinc dust had been forwarded Mr. Cowper-Cowles to determine whether it could be used in making an electrolyte for zinc plating. In the course of their experiments they placed a piece of steel in this zinc dust in a case hardening oven and heated it up to see if it would have any hardening effect on metal. When taken out it was covered with a silvery coating of zinc and on examining under the microscope they found it had penetrated and alloyed the zinc with the body of the metal. Recognizing the value of the discovery they immediately applied for patents in England and 28 foreign countries.

SECURING SHERARDIZING RIGHTS FOR THIS COUNTRY

A notice of this method of protecting iron and steel was published in the United States consular reports and was noticed by C. J. Kirk, who entered into correspondence with the United States consular agent in Birmingham, England, and the latter paid a visit to the sherardizing plant that had been established at Willesden Junction, just outside of London, and made a very full report on the process.

In the meantime the rights for the United States had been taken over by a firm of brokers in New York, who, after trying for about a year to introduce the method into this country, gave it up, and the United States Sherardizing Company was formed for the purpose of exploiting the process in the United States and Canada.

The first plant was established at the works of the New Castle Forge & Bolt Company, New Castle, Pa., and in July, 1908, about one-half ton of material was sherardized. Other plants were then established and by the following year the use of the process had increased to 1,223,900 lb. monthly. At the present time about 4,000,000 lb. per month of iron and steel are being treated by this method in the United States and Canada.

THEORY OF SHERARDIZING

Sherardizing may be defined as a process of sublimation, occlusion and adhesion, when considered in connection with the theory of ions. The process of passing directly from the solid to the gaseous state and from the gaseous direct to the solid state, in both cases stepping over the liquid state, is called sublimation.

The theory of sublimation and the "triple point" in connection with sublimation is fully defined and

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described in many elements of physics. It is a very well known fact that solids sublime. This is easily shown, for example, in the evaporation of ice when it is kept below its melting point. In the case of most solid substances this process is so slow at ordinary temperature that it cannot be detected. At ordinary temperature and pressure camphor, arsenic and many less familiar substances sublime. Solid carbon dioxide will volatilize at —79 deg. C. at atmospheric pressure without passing through the liquid state. Zinc as a solid may change into vapor without passing into the liquid state. For an exact definition of the physical condition of a body a knowledge of the values of all its variable properties is required. The three most important of these are temperature, pressure and volume occupied by unit mass of the substance. These are not independent of each other but are connected by a definite relation called the equation of state, which, in the simple state of perfect gases, takes the form of the gas law, which is the law of Boyle and Charles.

It is a well known fact that common metals are extremely porous. This is visible under a high power magnifying glass, as well as readily demonstrated by certain physical experiments. Thus, if an iron wire be placed in a vacuum tube and then heated to incandescence, as, for instance, by passing a current through the wire, the pressure within the tube rises materially and gas is evolved for a very considerable time, indicating that iron (and practically all other metals) contain large volumes of gases. The condition of the metal may be graphically described as resembling a sponge soaked with water.

HOW PRECIPITATION OF A VAPOR ON METAL OCCURS

When a porous solid is easily permeated by a gas and condensation on the surface of the pores of the solid takes place, it is called occlusion. An example of this can be seen in the absorption of 90 volumes of ammonia in one volume of charcoal. Spongy platinum will absorb about 250 times its own volume of oxygen. Paladium will absorb about 1000 times its own volume of hydrogen and will increase one-tenth of its volume. To produce such a condensation alone would require a pressure of many thousand pounds per square inch. Nearly all metals absorb gases and, being heated, will allow them to pass through readily. An example of this is the fact that hydrogen will readily pass through heated iron.

When a gas is in contact with a solid, there are molecular forces drawing the particles together, and this produces a surface condensation of gas on the solid. An example of this is the difficulty in removing the last traces of air from a vacuum bulb due to the adhesion of the air on the surface. Another example is the frosting of window panes in irregular figures.

There also appears to be an electrical condition accompanying the evolution of gases from a metal inasmuch as the evolved gases usually contain a number of free ions. This is particularly the case if the temperature of the metal is high at the time the gases are given off. Naturally the exposed surface of the metal is the only portion which actively takes part in evolving gases, so that the larger the area of surface exposed the greater the evolution of gas, other conditions being equal.

A further fact, which is well established, is that the presence of free ions has a marked effect in producing a precipitation of a vapor or suspended matter in a gas. It follows, therefore, that if a metal be heated in the presence of a vapor under such conditions that the gases or vapors contained within the metal are in part liberated; then, as the liberated gases or vapors contain some free ions, they will cause the precipitation within the pores of the metal and on the surface layer of a portion of the external vapor in which the metal is heated.

Now it is a well known fact that all materials have a definite vapor tension, depending mainly on the nature of the material, the nature of the surrounding materials, the temperature and the pressure. It therefore follows that under all conditions all substances are surrounded by a certain amount of their own vapor. The vapor can be increased in amount by increasing the temperature and decreasing the pressure.

METHODS OF PRODUCING ZINC VAPOR

Zinc vapor can be produced in several ways from zinc. If molten zinc is boiled in a reducing atmosphere, vapor is given off rapidly and if heated iron is brought in contact with this vapor sherardizing would take place. This method, however, is neither convenient nor economical because of the waste of zinc. The most practical and economical method is to use zinc dust, which is obtained as a by-product of a zinc smelter. This dust is practically amorphous and each particle consists of a small inner particle of more or less pure zinc surrounded by a thin coating of zinc oxide.

According to a well known fact, the vapor tension is higher for small particles than for large. It is thus desirable that the zinc be in a very finely divided condition, for the extent or degree of penetration of the zinc vapor in the iron depends upon its vapor tension. It is also desirable that there be as little impurity in the zinc as possible, for not only the zinc, but also the impurities, such as lead, cadmium, etc., will give off vapors, and the combined vapor tension of the mixture would generally be less than that for pure zinc.

As said before, the zinc particles are surrounded by a coating of zinc oxide. This oxide is very inert compared to metallic zinc and has a high melting point. It therefore is very advantageous in the process because it not only keeps the particles of zinc separated, but allows the spheres of vapor surrounding them to act independently with a high vapor tension and permits the temperature to be raised beyond the melting point of zinc without its becoming molten. Therefore, the percentage of inert material in the zinc dust plays an important part in the process.

TEMPERATURE AN IMPORTANT FACTOR

As mentioned before, the effect of temperature is an important factor in both elements of the process, as the iron, with the increase of temperature, increases its power of absorption of zinc vapor and likewise the vapor tension of zinc increases with the temperature. According to authorities on vapor tension, with an increase of temperature from 325 to 375 deg. C., the relative vapor tension increases 14 times, and from 325 to 425 deg. C., the relative vapor tension increases 92 times. The absorption of zinc vapors by various metals (copper, nickel and iron) approaches the same rate at high temperatures up to about the melting point of zinc. Above this the absorption is exceedingly rapid.

From curves obtained by A. R. Johnson and W. R. Woolrich, it is seen that the greatest variation of absorption with a variation of temperature lies near the melting point of zinc, thus a fluctuation of lower temperature does not affect the absorption of the zinc vapor to the same extent as at higher temperatures. In other words, more uniform ab-

sorption of zinc vapor is obtained at lower temperatures.

In view of the above facts it appears that when a metal is heated in the presence of the vapor of another metal, or the vapor of other elements or compounds, the metal evolves a portion of the gases or vapor which it contains, and in exchange accommodates the precipitation of the other vapors within its pores.

SHERARDIZING WITH ZINC UNDER VACUUM

After reading the above it is clear that to do sherardizing we should have the zinc vapors at their greatest tension and have sherardized iron in condition to give off the maximum gases. Zinc boils under ordinary pressure at 918 deg. C., and the boiling point under vacuum is reduced to 548 deg. C. Iron on being heated from 500 to 600 deg. C. in vacuum gives off gases readily. Therefore, it is quite clear that in vacuum the conditions are best for sherardizing, and the writer was able to produce condensation of zinc on iron in a very short time. Some of the results were obtained under these conditions in minutes, where with ordinary pressure under the same conditions it required hours. This process and the machine for treating material by this method have been covered by patents.

The process is not necessarily dependent on having the substances supplying the vapor in the form of a powder, although a substance in this form may often be raised to a temperature above the melting point without fusing the articles together. The elevated temperature which can thus be secured is of material assistance in securing a rich vapor, which naturally hastens the process and therefore is an advantage in many cases. A further advantage of using the material supplying the vapor in the powdered form is the enormously increased surface which can thus be secured, thus giving a richer vapor, since the amount of material vaporized at a given temperature and pressure increases with increased evaporating surface. This is particularly of value when the boiling point of the vapor-giving material is above the temperature at which the deposition occurs.

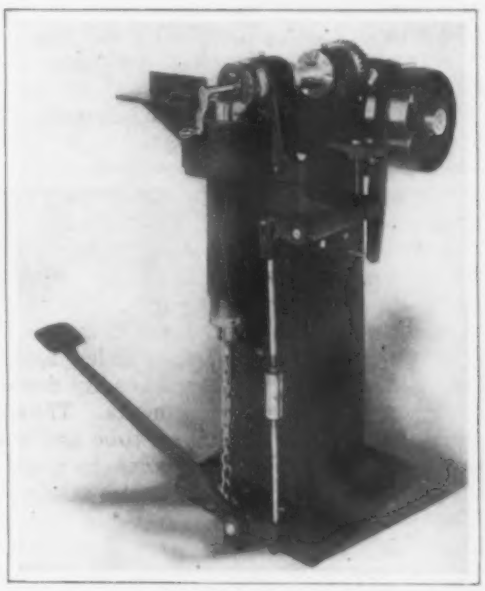
(To be continued.)

Reports of accidents to the various departments of the Pennsylvania State government are to be relieved of the burden of detailed information which has marked them and steps to draft a new form which will not only be interchangeable among departments, but easy to make, have been taken. A conference of men active in various lines has been held at the Capitol, Harrisburg, Pa., and about half of the questions in the accident report forms were stricken out and a much simpler form made up. Among those at the conference were George T. Fonda, Bethlehem Steel Company; Thomas Ewing, assistant to president, National Tube Company; James H. Maurer; A. Hunter Boyd, assistant general counsel, Baltimore & Ohio Railroad; Dr. Daniel Z. DuNott, chief surgeon, Western Maryland Railroad, and J. B. Douglas, chief of claims, United Gas Improvement Company.

Principally with a view of catering to the English market, the Tinfos Electrical Iron Works, of Notodden, Norway, has decided to extend its plant and to manufacture steel castings according to the London Times. The Tinfos works at present produces pig iron in electric furnaces from the low-grade ores of the mines at Kragerö and Arendal. The pig iron so produced is exported to Germany and the North of England and Scotland, where it commands a high price. It is estimated that, with their low power costs and low freight rates the Tinfos works can place castings in England at prices competing with both home and Continental productions.

A Special Copper Coil Forming Machine

For forming the copper field coils of the generators used in connection with electric lighting systems for automobiles, the Garvin Machine Company, Spring and Varick streets, New York City, has designed a special machine. These coils are wound with strip copper, instead of the ordinary



A Special Machine for Forming the Copper Field Coils for Automobile Lighting Systems and Handling Other Similar Work

round wire, such as was formerly employed for the purpose, and the machine takes the strip copper and coils it on a rectangular arbor, together with a strip of insulation. Although this is the main use for which these machines are intended, they can, nevertheless, be employed for other work of a similar nature, since the number and shape of the coils can be varied, and it is, of course, possible to utilize other metals.

The machine is practically automatic in operation and all the preparation that is necessary is to cut the copper to the proper length and make a right-angle bend at one end. This bend is used for dogging purposes, and the material is kept against the arbor by a powerful spring which is controlled by a foot treadle. Three revolutions of the spindle are sufficient to form the coil, and the machine is tripped automatically when that number has been made, and the coils are slipped off the arbor by turning the crank handle shown in the center of the spindle. The next strip is then put in position, and as soon as pressure is removed from the foot treadle the machine will start. The crated shipping weight is 665 lb.

American Boiler Manufacturers' Convention

The twenty-sixth annual convention of the American Boiler Manufacturers' Association will be held at the Waldorf-Astoria Hotel, New York City, September 1 to 4, inclusive. A number of interesting papers on subjects of importance to boiler and plate manufacturers will be read. The subject of uniform boiler specifications will be thoroughly discussed, and it is expected that some action on the subject will be taken. All boiler, tank and stack manufacturers and fabricators of steel plate as well as manufacturers of materials and supplies used by boiler manufacturers and their representatives are invited to attend the convention. F. B. Slocum, West and Calyer streets, Brooklyn, N. Y., is secretary of the association, and H. R. Cobleigh, Power, Tenth avenue and Thirty-sixth street, New York City, chairman of the publicity committee.

Color in Safety Goggle Lenses

BY F. W. KING

If anyone interested in the great safety first movement of to-day had the plant he was interested in put back just 20 years in safety devices, everything else would no doubt be immediately laid aside in order to install at once proper safeguards. Yet with generous safety measures, unless one is numbered among the very few who have carefully investigated the question of proper colored glasses worn by his men when working with high temperatures, his plant is just 20 years behind the times in one of the most important safety problems of

Arc Welder's Helmet, Made by the F. W. King Optical Company, with a Single Lens to Give the Proper Protective Color

to-day. Until the writer made a careful study, under factory conditions, of light and glare in the industries, everyone was using colors of lenses for different processes that had been in use for years without any scientific reason for their adoption in the first place.

As a general rule the establishment of a color was started by some workman who never heard of the ultra-violet rays, and when he started on new work, for instance oxy-acetylene welding, he would send over to town for half a dozen assorted colors and shades of glass. He would select one that was apparently the correct one and everyone since, at that work, has been using the same thing. The ultra-violet rays represent the shortest wave lengths of the spectrum and are invisible. A direct exposure to these rays, as in the process of the electric-arc welding, for as short a period as 3 minutes will cause total and permanent blindness, as the rays destroy tissue.

Incandescent steel at a temperature of over 2000 deg. F. gives off an injurious amount of ultra-violet rays and a proper colored glass is essential for safety first. A temperature of 6450 deg. F. encountered in arc welding, destroys the sight. It is therefore but reasonable to believe that the 4350 deg. F. in oxy-acetylene welding, if the operator is not using the correct glass, will cause his eyes to give out entirely if he keeps at it long enough. He may tell you his glasses are not hurting his eyes, but he does not know whether they are or not and when he does know it, it will be too late.

I have yet to see, in inspections in some 100 odd of the largest plants in the United States, a single instance where such an operator was not wearing a glass that was not only entirely wrong and which was of most decided danger to the eyesight. The most notoriously inefficient glasses observed are furnished and sold by some of the people of whom one buys his oxy-acetylene outfits.

Smoked glass of any sort is very transparent to the ultra-violet rays and hence permits these rays to pass and injure the eye. Besides this they allow the heat rays to go through, which by their intense energy are the principle cause of the eye strain. They are very deceptive as the apparent relief when they are worn is great, as they cut down the visible spectrum.

Blue is also bad, as it allows the very rays to pass it is necessary to eliminate. Any form of bifocal lens, so called, with a dark glass above and a light one below is entirely unnecessary, as with the single exception of arc welding a proper lens will enable one to see plainly to walk around and at the same time be efficient in accomplishing its purpose.

The subject is a large one and space does not permit the reproductions of spectrograms, etc., necessary to prove all the facts stated, but they are available to anyone interested. For open hearth work a special lens is desirable and one that will not fade because when the melter has become used to a certain shade any variation from this will result in the burning out of a furnace or ruining the metal.

Before the writer went into the subject of the colored lenses it was imperative to produce a white lens of the highest type for regular safety goggles as used in emery grinding, chipping, etc. Only lenses of hand-ground optical glass were considered, as the men should not be asked to wear lenses with waves and defects in them, and if they are not of special construction there is greater danger from broken pieces of glass than from the chip itself. The test required by the Illinois Steel Company described and illustrated in *The Iron Age* of May 21 was used in trying out the new type of lens which was produced. This test requires that a lens must withstand 15 blows of a steel ball weighing 16 grams dropped from a height of 21 in. to pass inspection. A test was just made in which the latest product the writer has developed withstood on an average of 486 blows before the lens broke. The weakest went at 88 blows and the strongest at 1750. This represents about the limit for optical glass at a reasonable price.

Production of Manganese Ores

The United States Geological Survey reports that the production of manganese ores in the United States in 1913, wholly in Virginia, according to statistics collected by D. F. Hewett, was 4048 tons. Though this was the largest output since 1908, the domestic production has for 20 years been negligible compared with the imports, which amounted to 345,090 tons in 1913. Though there are many deposits of manganese ores in the United States, most of them are too small to furnish large amounts of ore regularly. The ferromanganese manufactured in the United States is almost wholly from foreign ores; spiegeleisen is manufactured from the manganiferous residuum derived from New Jersey mixed manganese and zinc ores.

TESTING SHEET STEEL

A Machine for Ascertaining the Availability of Material for Deep Stamping, Etc.

A new method for testing sheet steel, or sheets of other materials, is given in a recent issue of Stahl und Eisen by A. M. Erichsen of Berlin, and appears to be of distinct value. It is carried out in the machine shown in Figs. 1 and 2, which can take sheets from 0.1 to 3 mm. thick (0.039 to 0.118 in.). This new method, which is protected by German patent No. 260,180, tests the metal in such a way as to bring out the properties needed for drawing, stamping, etc., and gives a result that can be truly called the "drawing value." The sheet is tested with a uniform amount of play between the die and the holder, so that it is free to move under the influence of the advancing ram, and can be pressed until fracture begins. The depth *a* of the rounded depression can be accurately measured, and constitutes the drawing value. It depends largely on the tenacity of the material, for not only is the material near the head stretched beyond its elastic limit but, since the piece is not held rigidly at any place, the stress is transmitted to the other parts of the piece. This is shown by the appearance after testing. Since the depth of the depressed part is greater the more metal that follows the head into the die, it follows that a higher tenacity is beneficial. This is a result that experience in actual working has shown to be true.

With homogeneous material agreeing results are obtained expressed in millimeters depression. Considerable differences are found with the various materials to be tested, and this is important, since the appearance of the depressed part gives ready indication as to quality. This is also important because the machine is designed to be used directly in the works where instruments of precision have not, so far, found wide use. The piece tested should preferably be 90 x 90 mm. (3.54 x 3.54 in.) and the

Fig. 1—The Sheet Testing Machine

amount of play given is 0.05 mm. (0.002 in.). The test piece should be carefully observed for the following points:

1. Whether the break is round, or whether it occurs prematurely in some special way. In the latter case the material is "fibrous" and not very suitable for drawing or folding. This is also shown by a comparatively low drawing value.

2. Whether the surface of the depression is smooth like the original sheet, or is "raw." If the latter is the case, then again the material is not suitable for deep drawing and stamping, the rough surface offering increased resistance. A premature break with repeated drawing is the result, even

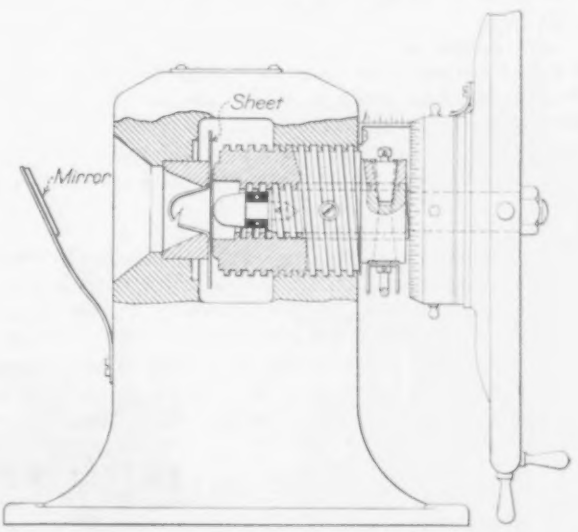


Fig. 2—Sectional Elevation to Show How the Machine Works

if the material appears to be otherwise all right. This appearance is often found in steel sheet, and points to over-annealing.

3. Whether the surface of the depression shows very fine small cracks. This applies to copper and tin.

For good drawing and stamping there is required therefore: A high drawing value, little fibrous formation and the smoothest possible surface of the depressed part, neither raw nor with fine cracks. Further the material must naturally be free from flakes and scabs, usually to be clearly seen by the naked eye, while laminations or blowholes are quickly made evident by the test.

Among the advantages of the new test are the following: that it is simple and quickly carried out, and the test piece requires no preliminary preparation. The results are clearly expressed, and can be observed and measured by the men in the works, for whom it is specially designed. Even the smallest differences in quality are made known by relatively great variations in drawing value. Also the appearance of the metal after testing allows valuable conclusions to be drawn regarding faulty mechanical or thermal handling of the material.

G. B. W.

The British Columbia Steel Works, Ltd., it is stated, will erect a large steel plant at Bridgeport, Lulu Island, B. C., on a site of 5 acres which it has acquired. The company has a capital of $500,000 and will require buildings and machinery for the plant to cost $100,000. It will manufacture merchant bars, angles, rounds, flats, bolts, nuts and light rails from scrap. Among the directors of the company are: Francis L. Leighton, general manager of the Vancouver Engineering Works; J. J. Bansfield, Nicholas Thompson, David A. Smith, president of the D. A. Smith Company; George E. Graham and Arthur M. Valentine, who is secretary-treasurer of the company.

A large calcium-carbide works at Notodden, Norway, is reported to be making extensions for the manufacture of electric steel and ferrosilicon, a new electric furnace for the purpose having been designed by the managing director.

GENUINE WROUGHT-IRON PIPE

Description of the Process of Manufacture from Pig Iron to Finished Product

BY CHARLES GROSS*

Sixty years ago the smaller sizes of wrought-iron pipe were welded by hand and swedged, while the larger sizes were riveted similarly to the present boiler-making process. Today, although the actual pipe making is done by automatic machinery, the making of genuine wrought iron is still done by human hands.

Wrought iron is obtained by refining in a puddling furnace the pig iron received from a blast furnace, the operation in the puddling furnace being done entirely by hand. Puddling is one of the very few operations in the iron or steel industry that still await solution by an inventive genius, as no attempts to puddle by means of an automatic machine have so far been sufficiently successful to secure adoption.

THE QUALITIES OF GENUINE WROUGHT IRON

To be durable and to fulfil the mission for which it is intended, genuine wrought-iron pipe must be tough, fibrous, ductile, possess resistance to shocks or vibrations, and contain a large factor of immunity to corrosion. In order that it may possess these important essentials the manufacturer must control the quality of the pig iron for its different purposes. Skelp iron, for instance, must be of a strictly neutral iron.

The iron ore as mined is brought to the blast furnace and converted into pig iron. Care has to be exercised in regard to the chemical composition of the pig iron intended for wrought iron. Whatever method may be employed in the refining of iron, there is but one definite object in view, and that is the removal of the carbon, phosphorus, sulphur and surplus silicon, also all other impurities, by oxidation and combustion.

The pig iron is brought to the puddling furnace and remelted. The puddling furnace of today does not differ in any way from the puddling furnace of fifty years ago. It consists of a firebox, where the heat is generated, and the hearth where the iron is refined. The heat is generated in the grate, passes through the hearth of the furnace and out to the stack. The puddling furnace has to be prepared for working, which is done by the puddler in the following manner:

THE WORK OF THE PUDDLER

A certain quantity of iron ore is ground and moistened with water so as to make a plastic mass. This iron ore is put up as a lining around the sides and back of the furnace. This is called the "fix," or fixing the furnace, which has the object of furnishing sufficient oxygen to burn up all impurities. It is also done for the no less important reason of protecting the walls of the furnace. After the fixing, the puddler charges his heat of about 560 pounds of pig iron and then closes the door of the furnace as nearly air-tight as possible, and the heat applied is raised to a point high enough to melt the pig iron.

When the melting state has been reached the puddler inserts into the furnace a tool known as a "rabble," with which he thoroughly works the molten metal. The object is to break up every piece of pig iron that has not melted.

After the metal has been thoroughly melted, the puddler commences to feed the iron with the flux, which is either cinder or scale, a certain amount of which is needed for a charge. During this process the greater part of the impurities are eliminated, some in the form of gases and the rest in a liquid form known as "slag," which runs off over the foreplate. At the end of this process the iron congeals into a semi-plastic mass and the puddler uses a tool called a "paddle," stirring the iron to prevent it from forming into lumps, and to break up any lumps that may be in the mass.

THE SQUEEZING AND ROLLING PROCESSES

This process is called "turning" and takes about 15 minutes, when the iron is ready for balling. The heat being made into three balls, the puddler takes each ball separately by means of a pair of tongs suspended from a rail called the "telegraph," which runs from the furnace to the squeezer. The squeezer is a machine having a drum rotating horizontally inside of a horseshoe curb, with which it forms an alley about 12 to 14 in. wide at the mouth and 7½ to 8 in. at the delivery side. This squeezing forms the iron into a shape of such a nature that the rolls can grasp it, which shape is called the "bloom." The bloom is rolled down to bars of different widths and thicknesses called "muck bar." The secondary object of the squeezer is to remove by pressure a certain amount of cinder still imbedded in the iron.

It is obvious that for such work, requiring constant attention and much strength, only skilled workmen can be employed.

The muck bar is cut up into different lengths and made into piles of the proper width, hight and length for the required product. These piles are charged into a heating furnace where they are brought to a glowing white heat or welding temperature. These piles, when intended for pipe, are then rolled into strips or plates which are called "skelp." The skelp iron is cut to suitable lengths and delivered to the pipe mills.

THE IRON-WELDING METHODS

There are two processes in making pipe from the skelp. One is the "butt weld," used for smaller sizes, where the edges of the skelp butt against each other; and the other the "lap weld," used on larger sizes, where the edges lap when formed into a tube.

The butt-weld process was originally done by hand by the use of tongs, but now a machine pulls the tongs through a device resembling a bell with the top cut off. This bell is held securely in place in front of a machine known as a drawing bench, on which runs a continuous chain. The skelp having been placed in the welding furnace from one end, the welder on the other end grasps the skelp with a pair of tongs, over which he runs the bell, hooking the tongs to the continuous chain. The skelp is thus pulled through the bell and formed into a tube, being welded at the same time. The pipe is then run through a sizing roll to give it the proper outside dimensions, and then through a set of cross-rolls having the purpose of cleaning and straightening the pipe, next passing to the cooling rack. The cooling rack delivers the pipe into a basket, but before reaching the basket the ends of the pipe are cut off by circular saws placed on each end of the rack. The pipe is cooled by dipping into a water tank, from which it is taken to the inspection table and then to the threading machines.

The lap-weld process is a totally different procedure, being designed for handling the wide skelp of which large sizes of pipe are made, and is

*Plant manager of the A. M. Byers Company.

as follows: The skelp is delivered to a charging machine which pushes the plate into a bending furnace. After each plate has been sufficiently heated the charger pushes it out at the other end into a machine known as a "scarfing roll machine," which gives a beveled edge to the hot skelp. A delivery table places the hot skelp in front of the bending die, which is mounted upon a draw bench machine, on which runs a continuous chain. The hot skelp is then grasped by a pair of tongs and pulled through the bending die by the chain, which forms the skelp into a tubular form with one edge overlapping the other, but not welded together. For this purpose the pipe is passed over delivery rails to another charger, which pushes all bent skelp, or so-called "hot skelp," into the welding furnace, where it is brought to a welding heat and pushed through the welding-roll machine. This machine consists of two rolls, one above the other, having a circular groove forming a nearly circular pass, with its diameter larger than the outside diameter of the pipe being made. Between these two rolls a rod holds a torpedo-shaped body of cast steel called a ball. The bent skelp passing through the welding rolls is welded by the outer pressure exerted upon the iron by the rolls and from the inside by the ball. After this operation the skelp has become pipe, the ball falls and the rod is withdrawn from the pipe.

FINISHING OFF THE PIPE

The pipe passes automatically to the so-called "blister rolls" which have the purpose of smoothing out the pipe, straightening the ends and solidifying the material. It then passes through the sizing rolls to assure absolute accuracy in the outside dimensions, and next to cross-rolls, where the surface of the pipe is smoothed off, freeing it from roughness and scale, at the same time being hot straightened. The pipe is then cooled and carried by the cooling rack to the straightening machine, where it is straightened while cold, as a slight warping during the cooling process has occurred. All of these rollings of the metal are essential in the making of perfect pipe.

Having been straightened while cold, the pipe passes on the inspection table, where the inside and outside defects are discovered and the good pipe finds its way to a set of rotary cutters, which cuts and trims it to the desired length.

The pipe is then passed to the scale and weighed, a detail upon which very much importance is laid. Any underweight pipe is rejected at this point. On the other hand, should it run somewhat heavier than standard weight, the test being a minimum one, the pipe is permitted to go to the shipping room, as its over weight naturally gives it greater value and the purchaser secures the benefit of additional security and efficient service. In this connection it may be stated that for 50 years every length of Byers pipe has been full weight, guaranteed.

THREADING AND GALVANIZING

The pipe is now delivered to the different threading machines, where it is threaded to Briggs standard gauges, and where the couplings are screwed on. The pipe is then passed to the testing benches, where it is tested to the required hydrostatic pressure. After testing it is again inspected, special care being given to the threads and the couplings. The pipe is weighed again and the length is stenciled on it. The thread protectors are now placed on the end of the pipe to prevent the threads from being damaged while in transit. The pipe is now ready for shipment or stock.

For special work consumers require galvanized pipe, and in such cases the galvanizing takes precedence over the threading. The galvanizing plant uses the so-called "hot metal" process. The pipe is prepared for this process by removing the scale, grease or any foreign matter from its surface with an agitating device in a bath of diluted sulphuric acid, which is called "pickling." The pipe then is washed with water and immersed in a tank of muriatic acid that gives it the necessary clean surface for the coating of zinc which is to follow. After drying, the pipe is placed in the galvanizing kettle containing molten zinc or spelter and then pulled out by tongs, when it is cooled in a water tank and inspected. It is now ready for threading.

The zinc or spelter coats more heavily on genuine wrought-iron pipe than it does on steel pipe. The porosity of wrought iron being greater than that of steel, it therefore takes on a greater percentage of spelter, which does not peel as readily as it does from steel.

The couplings used on genuine wrought-iron pipe are also made of wrought iron. All Byers couplings are rolled couplings, made by a roller-welding machine. The finishing of the coupling consists of facing, reaming, recessing and straight or taper tapping. Great care has to be taken in the finishing operations, as the threads have to be smooth and have to conform to the threads of the pipe.

This careful control of quality in every process of the manufacture of wrought-iron pipe is one of the fundamental reasons for its superior durability in actual usage. And the fact that today the highest quality of wrought-iron pipe is made by hand methods that were in vogue 50 years ago, despite the thoroughly modern and efficient equipment of the mills in which it is so made, is simply because no other methods have been found to equal these old ones for producing a pipe whose texture and flawlessness are up to the old standard of excellence.

By-Product Coke Ovens in Russia

According to U. S. Consul John H. Grout, of Odessa, Russia, in Daily Consular and Trade Reports for June 20, there are in South Russia 10 plants owned by 9 firms for the production and utilization of coke by-products. In the first nine months of 1913 these firms were operating 887 coke ovens producing by-products besides a large number of the old type. The increase in the last four years in by-product ovens was 563, or 15.8 per cent. In 1912 5,689,411 net tons of coal were consumed to produce 4,252,697 net tons of coke, as compared with 2,774,733 tons of coal to produce 2,020,831 tons of coke in 1903.

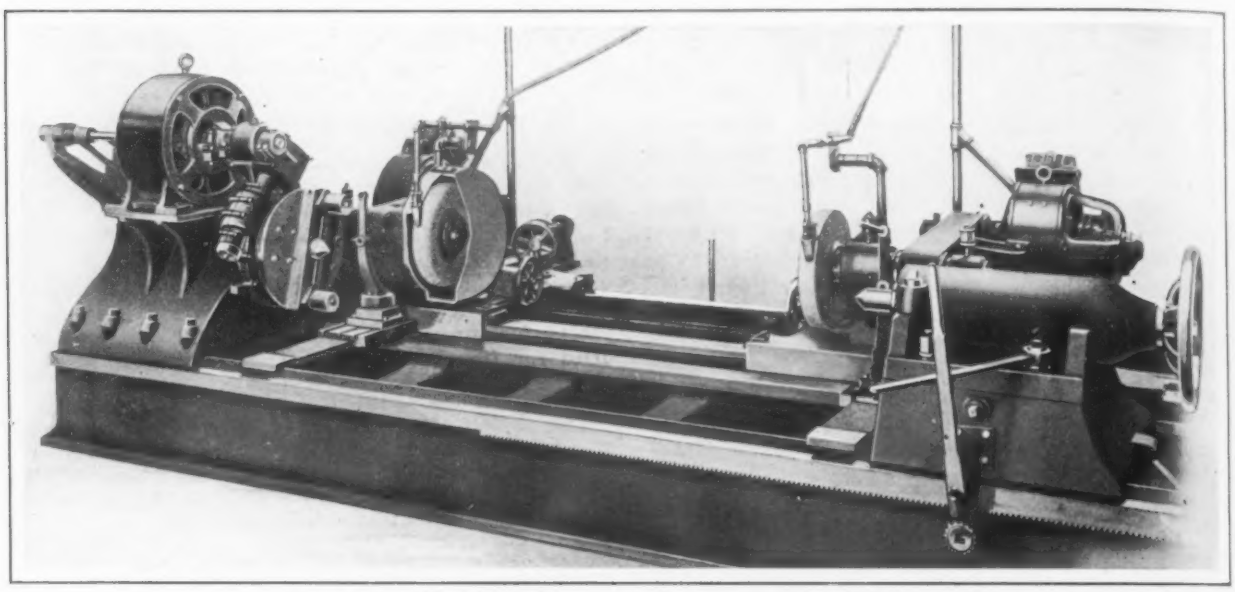
Sulphate of ammonia is beginning to be used in Russia as a fertilizer, but most of it is still exported. The pitch is used mainly, if not exclusively, for the production of briquettes and the heavy oils for the impregnation of railroad sleepers. Many more by-product ovens are planned for 1914, and it is expected that all the pitch produced will be absorbed by the rapidly increasing output of briquettes, of which it is calculated that over 500,000 tons will be manufactured this year.

Pig iron importations to the extent of 322,000 tons in the period extending to the end of 1915 have been decided upon by the budget committee of the Russian government. The price at which the imported iron will reach consumers will be practically equal to the current rates for Russian pig iron. Concerns entitled to receive the imported iron are classed as works producing agricultural machinery, iron works having no blast furnaces of their own, railroads, foundries and finally government plants.

Roll Grinding Machine with Two Heads

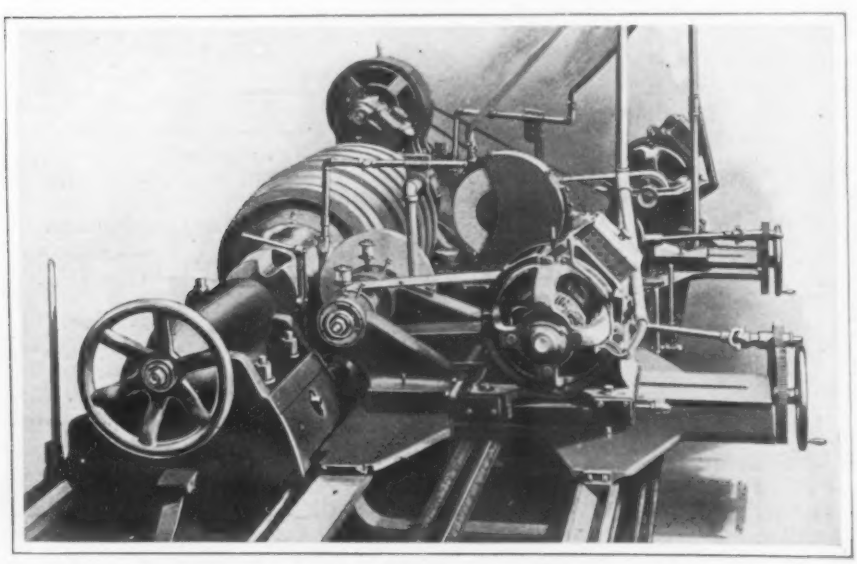
The Standard Engineering Company, Ellwood City, Pa., has built a machine for grinding both the necks and the bodies of rolls. There are two heads, both on the same side of the roll, and, as will be noticed from the accompanying engravings, the whole machine is of massive construction.

The roll is mounted on dead centers and driven by a 10-hp. adjustable-speed motor mounted on the headstock. Two sets of worm gears, which are entirely inclosed in an oil-tight case and have ball-thrust bearings, transmit the motion to the roll. The headstock is fixed in position at one end of the machine, while the tailstock has a longitudinal movement by a rack and pinion with a ratchet. In addition to this longitudinal movement, the tailstock also has a transverse adjustment for lining up the rolls and for grinding tapers.



Front View of a Roll Grinding Machine Equipped with Two Heads

Each of the grinding heads has a wheel 26 in. in diameter, which is driven by a 15-hp. motor, mounted on the carriage of the grinding wheel. Each wheel is protected by a heavy steel guard, which can be easily removed when changing wheels, and a supply of water is led to them through hose attached to the guard. With a view to keeping the peripheral speed of the wheel uniform as the diameter is reduced by wear, adjustable-speed motors are employed for driving them. The longitudinal travel of the heads is obtained by a screw driven by gearing and a belt from the motor on the headstock. Clutches are provided for controlling the motion of the grinding head through the engagement of the gearing driving the travel screw. These clutches are operated by the handle, which may be set at any convenient position on the front of the bed, and also by a stop on the carriage, so as to give a continuous motion in both directions. When the clutches are disconnected, it is possible to move the carriage by a handwheel which revolves the screw. The transverse travel of each grinding head is accomplished by a screw having a handwheel mounted on its end, and there is another wheel which is geared to the screw for making fine adjustments. In the end view of the machine one of the grinding wheels is shown in position to grind the neck of the roll, while the other is out of contact with the roll. The fine adjustment handwheel and that controlling the longitudinal traverse of the carriage are both placed in positions which are convenient for the operator while watching the work.



End View Showing Mounting of Grinding Wheels and the Motors Used for Driving Them

Devices for truing the grinding wheels are provided, by which it is possible to round the edges of the wheels to suit fillets in the roll necks. Housings for carrying the roll by the necks, instead of on the centers, are provided in case it is desired to use this method of grinding the bodies. Adjustments are provided for the housings, so that the rolls may be crossed or various other kinds of tapered work accomplished.

The bed of the machine is 30 ft. long, and it is possible to take rolls up to a maximum length of 21 ft. The swing of the machine is 50 in. and the approximate weight is 80,000 lb., including the grinding wheels. The equipment furnished with the machine includes two grinding wheels, hose for water supply, etc.

New Type High Pressure Reducing Valve

For reducing pressures in connection with the operation of hydraulic machinery the Schutte & Koerting Company, Twelfth and Thompson streets, Philadelphia, Pa., has brought out a special valve. These are made in a number of different sizes and for various pressure ranges, the one shown being the 4-in. valve, intended for reducing a pressure of 800 lb. to 500 lb. A slight variation of the outlet pressure is sufficient to operate the reducing valve, and the fluctuations that take place do not have to be considered.

In operation the initial pressure enters by the branch marked inlet and acts between the main valve *a* and the piston *b*. As the area of the latter is greater than that of the valve, the latter is kept tight upon its seat. To prevent water from passing from the top of the main piston to the underside a cup leather *c* is provided. The initial pressure passes from the high-pressure side into the port *d*, which communicates with a space at the upper side of the regulating valve *e*. This is held open by the action of the spring *f* and the high pressure is allowed to pass through the valve and down through the pipe *g* into the chamber under the piston plate *h*. The low-pressure side of the main valve body *i* is connected to the diaphragm chamber of the regulating valve by the port *j*. When the pressure under the diaphragm acting upon the area of the piston *k* exceeds the load for which the spring *f* is set the piston is forced up and the valve *e* is closed, thus stopping the flow of water to the chamber under the piston plate *h*. With high pressure acting on both sides of the piston *b*, the valve *a* is forced open by reason of the greater area of the piston and the pressure flows into the low-pressure side. When the flow of water into the chamber under the piston plate *h* is stopped the main valve *e* seats itself and the flow of pressure from the inlet side is checked.

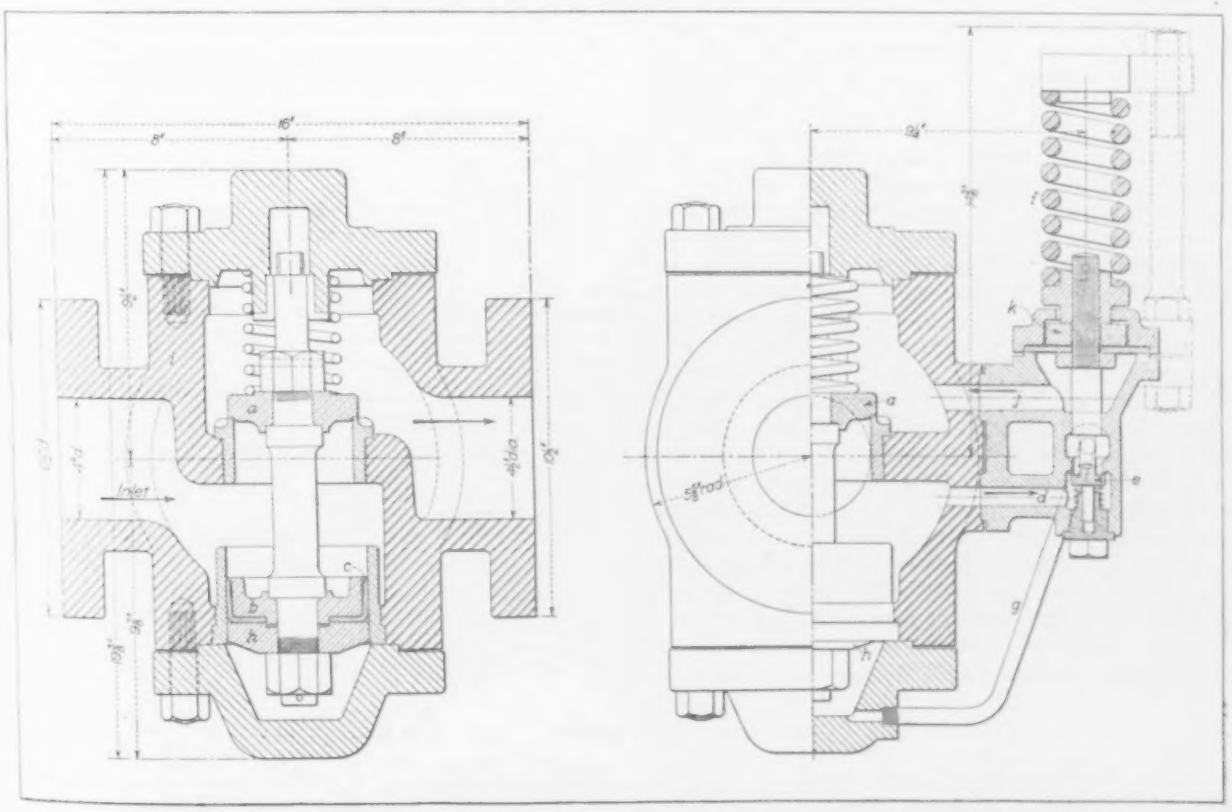
There is a constant leakage from the under side of the piston *b* to the low-pressure side through slots cut in the body of regulating valve *e*, and when the latter closes, the surplus water under the piston *b* is forced out through the pipe *g* through these slots into the diaphragm chamber and through the port *j* into the low-pressure side of the main valve body.

A New Patent Fuel Process

A new process of producing a fuel from coal dust, lignite, peat, sawdust, etc., has been patented by the Société Houillère du Nord d'Alais of France. It consists, according to the Echo des Mines et de Metallurgie, in mixing with the small material a colloidal substance such as the starches or the flour resulting from the grinding of rice, etc. The mixture thus obtained is compressed and the resulting briquettes submitted to an intensive drying which hardens them and renders them capable of withstanding the action of water for a long time without disintegration. As an example the following is given: Dry ground rice in the proportion of 2½ per cent. by weight is mixed with 97½ per cent. of anthracite dust; hot water or steam is injected into the mixture in order to transform the flour into a pasty mass, which is then kneaded before passing into the patent fuel press. The ovoids or briquettes are then dried for from three to four hours in a chamber at 100 to 200 deg. C.

The Bristol Company, Waterbury, Conn., has established a district branch office at Boston, and one of its sales engineers, F. H. Emerson, has been appointed Boston district manager with headquarters in the Old South Building. This year is the twenty-fifth anniversary of the founding of the Bristol Company and its plant has grown at the rate of doubling the floor space once every five years in the last 20 years. Over 65,000 Bristol recorders have been sold.

The American Peat Society will hold its eighth annual meeting at the rooms of the Commercial Club, Duluth, Minn., August 20, 21 and 22. No less than 23 papers are scheduled for the meeting, including one devoted to developments in the peat gas producer and one on "The Possibilities of Peat in the Beneficiation and Smelting of Iron Ores."



Drawing Showing Details of a New 4-In. Valve for Reducing an Inlet Pressure of 800 Lb. to 500 Lb.

TURBO-BLOWERS FOR FURNACES

An Investigation of Steadiness in Pressure, With an Observation on Its Advantages

Another contribution to the question of blowing engines for blast furnaces was made recently by Richard H. Rice, General Electric Company, West Lynn, Mass., in a recent issue of the journal of the

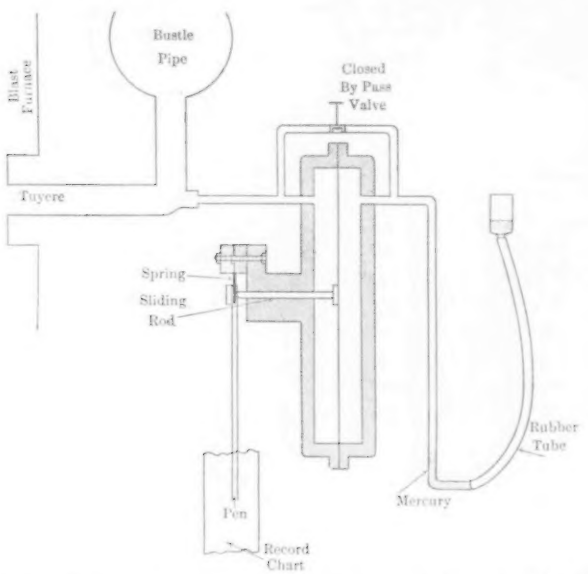


Diagram of Apparatus for Measuring Slight Pressure Variations of the Blast at the Furnace

American Institute of Mining Engineers. In connection with rating blowers in terms of the air delivery, Mr. Rice gives an account of a device designed to record pressure variations at the tuyeres of the blast furnace. A diagram of this measuring apparatus is here reproduced, together with the chart of curves showing pressure variations with the air supply from a turbo-blower and from reciprocating engines. The paper also included, however, the drawings of the design of a governor for controlling the operation of turbo-blowers in terms of the air volume, and a number of calculations to show the comparative efficiency among steam engine, steam turbine and gas engine blowing installations.

One of the accompanying drawings shows by diagram the apparatus used in making the test to prove the steadiness of blast from a turbo-blower. The object of the apparatus is to show small variations on top of a heavy pressure, such as 18 to 20 lb. at the tuyeres. It was regarded necessary because ordinary instruments for measuring pressures of this magnitude have so much inertia and are so far from being delicate that variations which it is desired to measure are dampened out. The apparatus is a differential recording gauge, consisting of a pressure diaphragm in a closed chamber; one side of the chamber may be subjected to a constant pressure and the other to the variable pressure to be measured. Motions of the diaphragm are transmitted to a delicate pen through a mechanism which is devoid of inertia, and the pen makes a record on a rapidly moving band of paper.

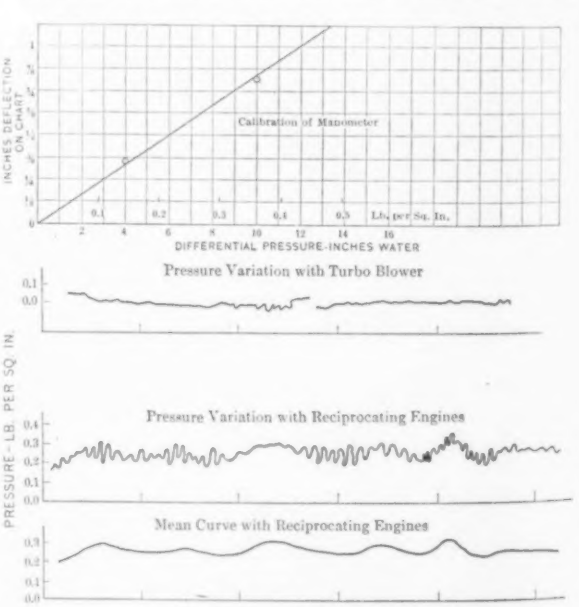
The diaphragm used was a thin copper disk, about 14 in. in diameter. Motions were taken from the center through a light rod, sliding freely through a close fitting bushing without appreciable leakage. The rod was pressed between the diaphragm at one end and the pen lever on the other, the fulcrum of the pen lever being a flat steel spring arranged to press on the rod and through it upon the diaphragm, even with the greatest pressure fluctuation. The chamber on the back of the diaphragm was connected through a pipe of considerable size to a mercury U, on the top of which was a reservoir for the mercury. The back and front sides of the diaphragm were connected by means of a by-pass and valve, and the apparatus was operated as follows:

The by-pass valve was opened, connected with two sides of the diaphragm and equalizing the pressure. As soon as the pressure had been equalized, the by-pass valve was closed and the pressure on the back of the diaphragm was adjusted by raising or lowering the mercury reservoir. As soon as this adjustment was complete the mercury reservoir was clamped in position. It was necessary that the by-pass valve, piping and mercury tube be tight and that the pipes containing the mercury be large so that the motion of the diaphragm did not appreciably change the capacity of the constant pressure side of the system. The motion of the diaphragm was very small, the tension of the pen spring on the diaphragm was considerable and the inertia of the moving parts was as small as possible, resulting in a moving system, which was, to all intents and purposes, dead beat.

When operating the apparatus the chart was moved past the pen by hand, and the time interval was marked on the chart by an observer using a stop watch, marks being made at every 5 sec.

The records shown by the second cut were made on a furnace working on Southern iron, and at the time it was blown with reciprocating engines there were four engines in use, two of which had steam cylinders 84 in. in diameter and air cylinders 84 x 60 in. stroke, while two had steam cylinders 44 in. in diameter and air cylinders 84 x 60 in. stroke. All were of the vertical long crosshead type, equipped with Corliss air-inlet valves, and modified Reynolds type discharge valves, and were operated at an average speed of about 40 r.p.m., the total displacement being about 60,000 cu. ft. of air per min.

It will be noted that the curve obtained when



Comparative Pressure Variations of the Blast as Supplied by Blowing Engines and Turbo Blower

operating in this manner is complex and apparently consists of a primary wave, and a secondary wave. Below the observed curve has been drawn one showing the primary wave, produced by tracing through the mean points of the secondary waves. These

primary waves may be due to the discharge of the reciprocating cylinders, while the secondary waves may be caused by the fluttering of the discharge valves. In contrast to these is shown a curve which shows the pressure variations observed with the turbo-blower.

Between the bustle pipe, where the observations were taken, and the engines, was a blast main about 1000 ft. long and of large diameter, as well as the usual stoves. The use of this long and large blast main and four engines resulted in smaller fluctuations than would have been experienced with shorter blast main and with only one or two engines in use.

ADVANTAGE OF STEADY BLAST

It is believed that the superior steadiness of blast pressure from the turbo-blower results in an increase of production, because the width of the melting zone is decreased, while the loss of fuel and ore due to the dancing of the particles on the blast and consequent attrition and blowing away as dust of such particles is reduced. That this is so is evidenced by the reduction of the amount of dust caught by the dust catchers, which has been found in all such installations to be a very considerable percentage. Since the width of the melting zone is reduced and all conditions of blast made more uniform, the blast can be used at a higher temperature.

In practice, the use of turbo-blowers, properly governed to measure the rate of blowing with accuracy, has the result of appreciably increasing the amount of iron produced, and this with a more uniform quality. This increase of production is accomplished without increase in the total coke charged and therefore the coke ratio is reduced. There is evidence that this increase of production and decrease of coke ratio may amount to 10 per cent.

Another Profit-Sharing Plan at Cleveland

The W. S. Tyler Company, Cleveland, Ohio, maker of wire cloth, ornamental iron and brass work and other metal products, has adopted a profit-sharing plan which will become effective January 1, 1915, but will apply to earnings of the company during 1914. After 6 per cent. interest on capital stock has been deducted, cash dividends will be paid to men employed three years or more on the same percentage as to stockholders, based on the total amount of wages paid each employee during the year. Employees who have been in the company between two and three years will receive dividends based on their year's wages at two-thirds the rate paid older employees, and employees who have served between six months and two years will receive one-third of the cash dividend rate. Should employees be laid off through lack of work they will be entitled to their share of the cash dividends based on wages received by them during the year.

The Terry Steam Turbine Company, Hartford, Conn., is filling a number of interesting orders for turbines contracted for the past year. The Italian Government placed an order for 19 and followed this with one for eight more. Satisfactory tests of these turbines, it is added, brought an order for 24 from N. Odero & Co., Sestria, Ponente, Italy. The Philadelphia Electric Company has bought 20 turbines for its new generating station. In order to handle increased business, the company has added to its machine tool equipment and increased its capacity 25 per cent. The working force also has been added to to meet incoming business.

S. Walter Platt, formerly with C. Davis & Co., Pittsburgh, announces that he has opened offices at 616 Oliver Building, Pittsburgh, to represent the Canton Iron & Metal Company, Canton, Ohio, dealer in iron and steel scrap.

Blast-Furnace Slag as Aggregate in Concrete

The adaptability of blast furnace slag as an aggregate in concrete has always been recognized by large iron manufacturers, who early made use of this handy material when concrete construction was undertaken around their plants, but it has not been adopted generally. Its advantage in reducing the dead weight per cubic foot of concrete has made a strong appeal to many engineers. A summary of a paper on this subject by W. A. Aiken, Philadelphia, Pa., before the seventeenth annual meeting of the American Society for Testing Materials follows, giving the results of his extended experiments:

"The object of the investigation, the results of which are given in the paper, was to determine the value of blast-furnace slag as aggregate in concrete. Preliminary tests were first undertaken to develop the relative value of this material compared with limestone and Birdsboro trap rock, in order to determine whether a more extended investigation of furnace slag was warranted. As a result of this preliminary work 600 6-in. concrete cubes were made up in the proportions of one part cement, two parts sand and four parts slag, by volume.

"A standard Lehigh Valley Portland cement, normal in every respect, and Jersey gravel, material almost universally used as sand in the vicinity of Philadelphia, and crushed slag, commercially called ¾-in. material, were used throughout this investigation. The concrete was mixed by hand to ordinary work consistency, rather wet than dry. One hundred test specimens were broken at the earlier periods, twenty-eight days, three months and six months, respectively, but the number was reduced to fifty each at nine months and one year. The remaining hundred specimens were kept for later periods, it being proposed to break ten each at six-month intervals up to six years:

"Compressive tests furnished the following average data:

Age	Compressive strength, lb. per sq. in.
28 days	1561
3 months	1952
6 months	2589
9 months	2841
1 year	2797

These results are differentiated and discussed in detail in the paper.

"The main point is whether the compressive-strength values developed are sufficiently great to warrant the employment of slag as aggregate, in competition with broken stone and gravel. Mr. Aiken thinks the findings are in favor of this, since his experience has been that the crushing strength of broken stone or gravel concrete, made up under ordinary field conditions, will not average over 1500 lb. per square inch at the age of thirty days.

"From the actual strength of the concrete, the weight of the slag per cubic foot (which is less than that of most material used similarly); the recognized solubility of slag which permits it to act as a puzzolanic material; its alkaline nature, which is especially conducive to rust-prevention in reinforced-concrete construction, and from the relative high combined percentages of silica, alumina and iron, making for permanency in the resulting concrete; he concludes that slag of similar constitution is in every way satisfactory for use as aggregate in concrete."

Officials of the Oliver Chilled Plow Works, South Bend, Ind., emphatically deny the report that it will close its Hamilton plant.

Modern American Blast Furnace Practice*

The Lines and Records of an Eastern Stack—Larger Hearths with Lower and Steeper Boshes the Tendency

BY EDGAR S. COOK†

The accompanying drawings show the development of the lines of the modern blast furnace of the East, taking Warwick No. 2 as an illustration, and the tables give the records for each blast of this furnace.

FIRST BLAST, 1901-1904

The lines of the first blast were obtained by practically making an enlarged photograph of the No. 1 furnace 70 ft. high, which had done satisfactory work on merchant pig iron of various grades, using the usual materials commonly employed in the East. The records show that the first blast was extremely unsatisfactory. Passing through the period of organization on a new plant would account for some of the trouble, but the management felt that there were serious difficulties with the furnace itself.

SECOND BLAST, 1904-1907

The lines of the second blast were copied from the Edgar Thomson standard at that time. It will be noticed that they are somewhat between the lines of E and K furnaces at Edgar Thomson, as shown in Mr. Brassert's paper. The decision to make this change was made after investigating the lines of most of the furnaces in this country which were doing good work. It was also decided—following this investigation—to eliminate all cooling plates above the top of the bosh. The work on these lines was fairly satisfactory, as is shown by the records. The Gayley dry blast was applied at the end of this blast and the results published the following year.

THIRD BLAST, 1908-1911

The hearth was increased in diameter and the bosh jacket was installed; also a revolving top was used and protection at the stockline. The only reason for blowing out this furnace was the failure of the hearth jacket. The wear lines were extremely uniform and the furnace inwall in good condition when blown out. This was the most satisfactory blast.

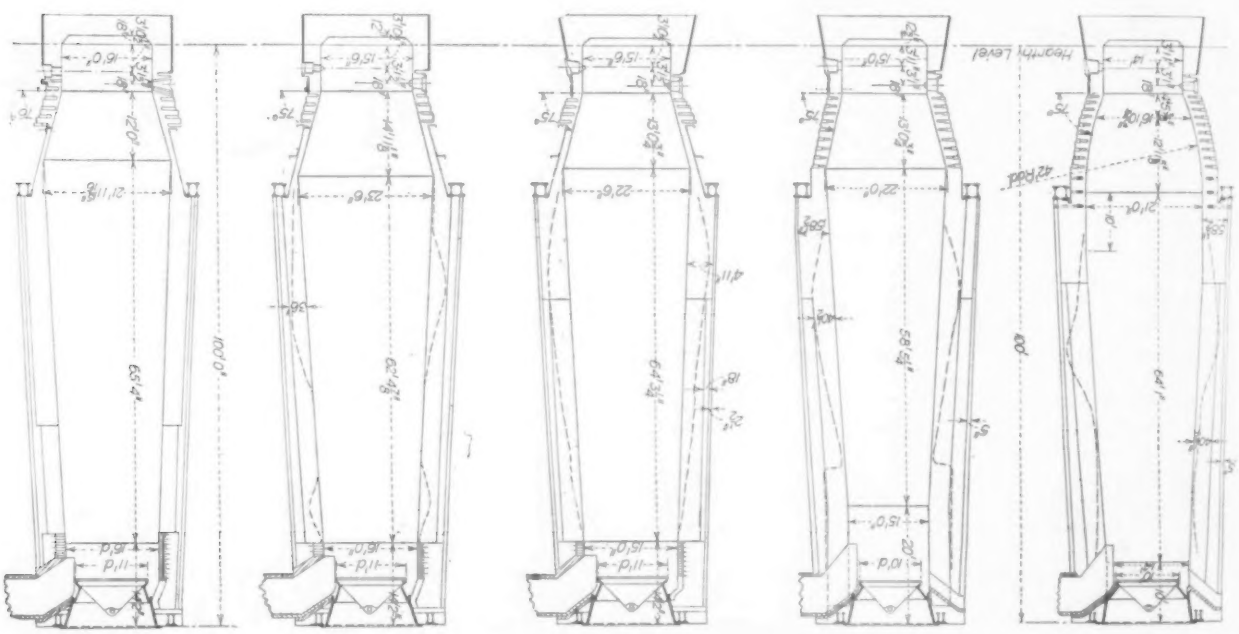
FOURTH BLAST, 1911-1913

In order to use the bosh and bosh jacket, this furnace was blown in with the same size hearth. In order to save time and brick and try an experiment, the bosh was made nearly 2 ft. higher than in the previous blast. This furnace gave more trouble with sticking and high pressure from the start, and did not work satisfactorily for so long a period. The effect was as if the furnace was partly worn out when she was blown in.

FIFTH BLAST, 1913—BLOWING OUT

The hearth was increased to 16 ft. and the bosh angle made 76 deg. The bosh is 12 ft. high, nearly 3 ft. lower than in the preceding blast. This lining has only been in operation for a few months and the furnace is doing excellent work.

A paper could be written about each one of these blasts concerning the troubles that were experienced and overcome, or that could not be overcome until the next blast. The consistency of the work is particularly noticeable, on account of the various materials used.



Blown in Oct. 6, 1901 Blown out June 4, 1904	Blown in Nov. 1, 1904 Blown out Dec. 27, 1907	Blown in Sept. 26, 1908 Blown out Apr. 7, 1911	Blown in July 20, 1911 Blown out Aug. 13, 1913	Blown in Mar. 10, 1913

LINES AND RECORDS OF WARWICK NO. 2 FURNACE, WARWICK IRON & STEEL COMPANY

*Discussion of Hermann A. Brassert's paper before the New York meeting of the American Iron and Steel Institute, May 22. The paper was published in *The Iron Age*, June 25, July 2, July 9, and July 16.

†President, Warwick Iron and Steel Company, Pottstown, Pa.

On the other furnaces successful attempts were made to use larger hearths, a little steeper boshes, and with the bosh jacket so designed that no offset or step could form in the furnace. One furnace was built with a bosh only 9 ft. high and gave good results. Experiments were made on a smaller furnace with the dimension from the center of the tuyeres to the beginning of the bosh slope. These experiments seemingly confirmed the German practice that there is an advantage in having this dimension great on foundry iron, and an advantage in having it as near nothing as possible on very low silicon iron. For the average merchant furnace about 18 in. is apparently satisfactory.

No. 2 Furnace. Comparison of Basic and Foundry Practice.

Kind of Iron	Analysis			Mixture			Mill product	Average daily tonnage	Fuel per ton, R. R. weight	Limestone per ton	Stove heats	Top heats
	Si.	P.	S.	Soft hematite	Hard hematite	Magnatite						
Basic	0.49	0.769	0.040	19.6	47.6	27.8	5.0	575	1,962	916	1,157	386
Foundry	1.80	0.787	0.034	23.5	38.0	31.4	7.1	483	2,236	803	1,180	528

Record of Blasts of No. 2 Furnace.

Period	Total tonnage	Daily average	Average Fuel per ton	Average stone per ton	Ore mixture			
					Hard hematite	Soft hematite	Magnatite	Mill Product, etc.
1st. Blast	328,251	360	2,730	1,294	33	30	21	16
2nd. Blast	507,631	456	2,325	1,080	39	29	23	9
3rd. Blast*	464,434	512	2,097	878	43	23	28	6
4th. Blast	362,963	491	2,191	963	44	16	33	7

*Dry Air Plant installed.

MATERIALS—ORE

All kinds of iron-making material are available in the East—Lake Superior ores, magnetic ores of various kinds, Clinton ore and foreign ores from Spain, Sweden, Greece, Africa, Cuba, and mill products, cinder, scale and pyrites cinder. All of these materials were used in varying proportions at various times on the No. 2 furnace. Titaniferous ores were not available. Mayari, and a Greek ore of similar analysis, were used up to 25 per cent. of the mixture.

Yearly Record of No. 2 Furnace.

Year	Annual tonnage	Year daily average	Fuel per ton	Best monthly tonnage	Daily average for B. month	Fuel per ton	Annual average stone per ton	Hard hematite	Soft hematite	Magnatite	Mill products	Top heats	Stove heats
1902	115,519	265	2,810	10,595	353	2,815	1,424	35	33	16	16	803	1,043
1903	134,019	381	2,791	12,620	407	2,695	1,300	30	30	20	20	673	1,147
1904[1]	84,735	420	2,608	13,147	424	2,482	1,159	34	28	25	13	668	1,040
1905	163,155	454	2,359	14,796	477	2,296	1,097	41	28	24	7	475	1,036
1906	165,548	474	2,237	16,509	550	2,190	1,060	42	32	18	8	378	984
1907[2]	156,643	450	2,378	15,522	517	2,320	1,074	34	28	29	9	375	1,066
1908[3]	48,248	492	2,094	16,976	547	2,035	962	46	20	23	11	395	1,062
1909	189,778	526	2,067	17,831	575	1,962	887	42	18	35	5	386	1,157
1910	179,435	510	2,089	17,797	574	1,947	848	40	30	27	3	377	1,092
1911	122,250	481	2,149	15,940	514	2,106	885	40	20	30	10	379	1,121
1912	183,416	507	2,050	16,491	532	2,000	931	52	15	28	5	373	1,147
1913[4]	76,775	468	2,306	14,975	499	2,154	994	40	13	42	5	515	1,075

[1]In blast 30 weeks in 1904. [2]Furnace blown out December 27, 1907. [3]Furnace blown in September 24, 1908. (Dry Air Plant installed.) [4]Furnace blown out August 13, 1913.

The problem of making up a blast-furnace mixture, in order to make the most money, is an intricate one. Careful observation and experience showed that there were certain general rules which were carefully followed in making standard iron: 1. To maintain a base of at least one-third first-class hematite ore. 2. Not to use iron-bearing materials of inferior quality or hard to reduce, except at a large differential in price, and then only in small proportions. 3. Magnetic ores well prepared can be used up to 40 per cent. of the mixture without seriously affecting the fuel consumption and tonnage, although these ores increase the cares of the blast-furnace manager and makes it much more important to carefully watch the operations and maintain uniformity, particularly in the distribution of stock and air. 4. Select ores to maintain the slag volume at the desired amount for the particular furnace on a particular grade of iron, and to also keep the slag uniform in the ratio of silica to alumina, that experience has shown to be the best.

PREPARATION OF MAGNETIC ORES

The successful use of magnetic ore depends largely upon its preparation. First of all the ore should be small so as to be readily attacked by the gases. Crystaline ores can be crushed to pass a 4-in. ring and only a trifling percentage will pass an 80-mesh sieve. This ore works well, making little flue dust. The difficulty encountered in its use is a tendency to run ahead like sand; this can be partly overcome by the filling. It should be kept out of the mixture in blowing in and increased in the mixture by small percentages.

Very fine magnetics should be mixed with flue dust and sintered, the resulting product being satisfactory. If used without sintering, the flue dust

made is excessive and there is a decided tendency to build on the bosh of the furnace. Both magnetic separation and cobbing are practiced to remove silica and phosphorus. Where sulphur occurs the ores are roasted, or sintered or nodulized and the sulphur eliminated or changed to a less objectionable form.

Some magnetic ores reduce quite readily in the furnace, and these do not require as careful preparation. There has been much progress made in ore preparation in late years with resulting benefit to the furnace practice. Not only are the ores more readily reduced on account of this preparation, but they are much more uniform and lower in silica.

FUELS AVAILABLE

The fuels available are hard coal, West Virginia and mountain cokes, Latrobe and Connellsville cokes. The best Connellsville and Latrobe cokes were found to be the cheapest fuel except under special market conditions. A great deal of attention was paid to obtaining a uniform coke of the best quality. Provisions were made in the laboratory to analyze each car of coke when necessary. Each car was carefully inspected to make sure that the coke was of proper physical quality to resist the destructive action of the gases in the furnace. Much attention was also paid to careful screening of the coke at the furnace, all coke under ¾ in. being screened out—this again being screened through a ½-in. revolving screen and separated from the breeze, the resulting size being used in a small regular percentage in the furnace when it could not be sold or utilized for any other purpose. If the fuel mixture contains a large percentage of this small coke, sticking and other irregularities result in a short time. The fuel records are based on railroad weights with no wastage deducted.

FLUXES AVAILABLE

Pure calcite and dolomite stone are available, the latter being much the cheaper in cost per ton. All calcite or all dolomite was used at times according to the alumina content of the slag. There are some excellent records on dolomite stone with a slag carrying over 3 per cent. of sulphur for long periods. It was, of course, necessary to this condition that the slag should be bi-basic and the alumina low to prevent the formation of spinel. There is much less danger of lime scaffolds in the use of dolomite than in the use of calcite stone.

It was found desirable to keep the slags practically uniform in the relation of silica to alumina for various grades of iron, and the proportion of calcite and dolomite are therefore maintained practically constant, the rule being to use three-quarters of calcite and one-quarter of dolomite on basic iron, and on foundry iron one-half of calcite and one-half of dolomite.

The percentage of stone used varied at times from 18 to 45 per cent. of the ore mixture. The best work was done on 18 to 20 per cent. of stone on basic iron, and about 24 per cent. of stone on foundry iron. It was found desirable to keep the stone uniform in size, and clean. The smaller sized stone is best for basic iron, as it seems to facilitate the use of a more acid slag.

PRACTICE

The furnaces have always been carefully dried out before blowing in. The blow-in, such as used at Edgar Thomson, and described by Mr. Gayley in 1890, has always been the practice at Warwick, exceptional care being taken to see that small tuyeres are used in the blow-in, and the tuyere velocity kept as constant as possible as the wind is increased; also, the wind and the heats are kept down until a heavy burden is at work so as to insure a low zone of fusion. Care is taken to coat the furnace with graphite to protect the brickwork in the first two weeks of the blast.

As previously stated, fine magnetics are not used in the blowing-in mixture, but are added slowly. Eastern practice varies so much with the special material conditions at many plants that little can be said of it in a general way.

In the past when acid slags were used on light burdens much trouble was experienced with high melted scaffolds. Later a change to very basic slags overcame the scaffold difficulty. The difficulty experienced with this practice was building on the bosh, and the fuels were high. Still later experience showed that with the use of better fuels and heavy burdens of well-prepared ore the heat can be kept in the hearth on a more acid slag. With this practice the fuels are lower and the building on the bosh is slower. However, the heat must be kept in the hearth, and if this cannot be done with burden it must be done with lime, whatever the consequences.

SULPHUR AND MAGNETIC ORES

Sulphur is the usual limiting feature in acid practice. For this reason all materials containing sulphur were avoided by us and an attempt made to run the furnace on a small slag volume and as acid as consistent with the making of good iron. The troubles are high pressure and sticking, and the peeling off of the bosh with consequent overburdening, and closing of the tuyeres with iron.

Magnetic ores, particularly the finer ones, greatly increase the risks of furnace operation. The reason the bosh jacket is preferred is because the bosh plates can hold between them as the bricks melt away so much unreduced magnetic ore. A sudden cooling of the furnace due to water leaks or other causes, an error in distribution, dirty coke, and even cutting the heats too low suddenly, causes the carbon coat and accumulation of finely divided ore to come off the bosh. The consequent overburdening of an already heavily burdened furnace sometimes causes chilling.

For this reason great uniformity is required. The revolving top is practically essential. The relation of the bells to each other and the stockline, and the movement of the bells, is of great importance. The air distribution must be correct and the tuyere area very carefully fitted to the furnace and the practice. The length of tuyere is varied according to the quality of the iron and the condition of the furnace. High uniform heats are essential to produce low fuel, as much of the magnetic ore must be reduced by the direct process of incandescent carbon.

BENEFITS OF DRY AIR

The dry air plant is of great benefit, not only for the fuel saved but also because it eliminates the very expensive troubles which furnaces using magnetic ores experience during periods of high and irregular moisture. I feel that the dry air plant will be as well understood within a few years as hot blast stoves—that it is of great value under certain conditions, and a desirable luxury under other conditions. While many furnaces do not work well with high blast temperatures, our experience has been that with the dry-air blast we have been able to utilize the full power of our stoves, and this has been confirmed by Mr. Reese with the use of dry air at the furnaces in Cardiff, Wales.

The new lines and appliances have greatly decreased the difficulties. It is possible that steeper boshes, such as used at South Works, will be a further help. So far, however, we have been unable to build a furnace which will keep itself clean, and settle regularly, month in and month out. The records show that the work is good, but this is due to the prompt measures taken by a trained organization on the first sign of trouble.

Every irregularity is immediately given attention and an endeavor made to ascertain the cause. Small cleaning blanks are used or the furnace is run very acid for short periods. Large blanks or other excessive measures are used in case of emergency, as when the furnace starts to scour, with consequent cooling of the hearth and with the top of the furnace becoming hot.

SUCCESSFUL PRACTICE AND CONSTRUCTION

Successful practice is closely allied to the construction. The ideal toward which we all strive is to so improve and adjust our lines, construction, appliances and materials that the practice will be uniform and easy and consequently economical. At first it was thought that the large furnace was only suited to the manufacture of basic iron. In the third blast foundry iron was made, 500 tons a day of high silicon on the lowest coke known at the time. After this low phosphorus iron was successfully made.

My remarks in regard to practice refer chiefly to basic iron. Foundry iron is made with less risk, although if low fuel is expected the principles are the same. The margin of safety is greater on the foundry grades. A furnace that will do good work on foundry is often an absolute failure on basic iron, while the good basic furnace is usually an excellent maker of foundry grades.

Mr. Brassert's remarks in regard to organization cannot be too strongly emphasized. I feel that whatever success I have met with has been in a large part due to being able to interest the men, down to the keeper and cinder man, and, in the old days, the top filler. Often these men have given advance information, and have called attention to small details of operation which have proven of the greatest value in anticipating and correcting large troubles. Just as every detail of the operation should be studied, so should every man about the furnace plant be given attention, to the end that his eyes and brain may be utilized to secure smooth running.

CONCLUSIONS

In summing up, the main points of interest are:

1. The Edgar Thomson furnace, which did the best work about 1900, using Lake Superior ores and making steel works iron, proved the most satisfactory furnace at that time for using the various ores of the East on merchant grades of iron.

2. The development in the East has been along the lines of larger hearths and lower boshes, the same as the development in the West. Somewhat steeper boshes seem desirable.

3. The large furnace, which at first was thought only suitable for making basic iron, has since been found to make all the grades of merchant iron—foundry, Bessemer, malleable, and low phosphorus—of a satisfactory quality, and with as low fuel as the small furnace.

4. Various difficult materials can be used up to a certain percentage, good work and long life be gotten out of a furnace, provided care is taken to see that the stock distribution and the air distribution are correct, and attention given to proper uniformity of operation.

It is hardly likely, as Mr. Brassert says, that there will be the development in the future that I have witnessed in the 40 years that I have been actively engaged in the blast furnace practice. I feel, however, that new problems will be coming up from time to time, which will require the vigorous efforts of our best men to satisfactorily solve.

Moreover, it is sometimes hard to hold the advantage won. The older men pass on and, with the younger men lacking practical experience, errors creep in which are difficult to locate. Every mechanical genius cannot be expected to have the advantage of a blast furnace training. The metallurgist must be always on guard to see that the mechanical engineer in improving construction does not interfere with the process.

There are no mysteries about a furnace, but there are many seeming mysteries which are usually a combination of a number of small errors, in construction, materials, fluxing and management. These must be patiently sought out and eliminated one by one. Diagnosis is as difficult at times as the physician experiences in treating the human body.

Tower of Jewels at Panama-Pacific Exposition

Marking the main entrance to the Panama-Pacific International Exposition and the center of the main group of exhibit palaces is the lofty pyramid of steel, now nearing completion, that is to compose the Tower of Jewels. The tower is to be 435 ft. in hight and surmounted with a sphere 17 ft. in diameter, illuminated from within and supported by eight Atlases. The exterior of the edifice is to be ornamented with 150,000 glass jewels, which, with the play of searchlights upon them, will furnish one of the spectacular illuminative features of the exposition. Some 1500 tons of steel and 1,600,000 bd. ft. of lumber go into the construction of the tower.

There will be seven balconies, three of them with colonnades, at different altitudes. The base of the tower covers an area 130 ft. square. There will be two elevators in the tower but spectators will not be admitted, the elevators being a part of the fire prevention system to save the shell of timber and plaster composing the decorative exterior of the tower. The high pressure system installed throughout the exposition grounds will carry water to the top of the tower. It is to be equipped also with a cornice sprinkler system capable of throwing a continuous sheet of water over the entire exterior from top to bottom. It is estimated that the tower will be 4 in. higher on a hot day than on a cold day, owing to the expansion of the steel.

Locomotive Orders

Recent orders for locomotives include 10 for the Canadian Pacific Railroad, five for the International Railways of Central America and five for the Erie Railroad, all of which are to be built by the Baldwin Locomotive Works. The American Locomotive Company will build five locomotives for the Bangor & Aroostook, while the Lima Locomotive Corporation is reported to have an order for 30 engines for the Southern Pacific. The Toledo Terminal is enquiring for five locomotives and the Grand Rapids & North Western for eight. Reports that the Wabash has placed its order for 60 locomotives are incorrect; the matter is still pending.

The Otto Coking Company, New York City, has been awarded the contract for the erection of the plant of the Niagara Coke Corporation, Buffalo, the cost of which will approximate $1,000,000. It will be located on a 50-acre site adjacent to the plant of the Lackawanna Steel Company, which will utilize a considerable portion of the coke and by-product gas produced by the new company.

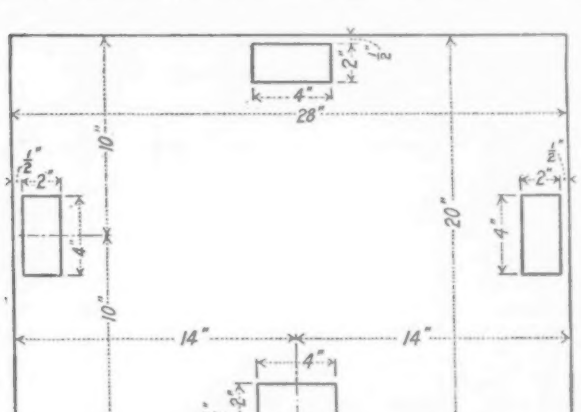
TIN AND TERNE PLATES*

A Method of Accurately Sampling and Analyzing Coated Sheets

BY J. A. AUPPERLE†

In response to inquiries to the manufacturers and consumers of tin, terne and lead-coated sheets, we received information which showed there was no uniformity in the method of sampling of these materials, nor in the amount taken for analysis. As regards chemical analysis, we found that about 90 per cent. of the replies received described the method which will be referred to hereafter as the "proposed method."

Tin, terne and lead-coated sheets invariably contain a ridge of heavy metal at one edge, due to the flow of metal after the sheets are coated. The manufacturer ordinarily bases the weight of coating upon the weight of a box of black sheets, and the weight of the same sheets after coating. The consumer is



Location of Samples from a Plate

not interested in the amount of heavy metal on certain portions of the sheet known as "list edge"—that in which he is interested is the average weight of coating. Consequently, when an analysis is made disregarding the "list," a difference of several pounds per box may be found between the amount of metal the manufacturer puts on the sheet and the amount found by chemical analysis.

In order to standardize the methods of sampling, it is desirable to disregard the "list edge" and to take a sample which fairly represents the average of the sheet. From investigations which we have conducted, we believe that samples from near the four edges of the sheet accurately represent the average coating. We therefore propose the following method of sampling and methods of analysis:

METHOD OF SAMPLING

Four 2 x 4-in. pieces are cut, one from each end and each side of the sheet, parallel with the sides and equidistant from the ends, as shown in the illustration. One sheet from each grade or shipment is taken for analysis.

These samples, before weighing, should be thoroughly cleaned with chloroform, carbon tetrachloride or gasoline. Each piece is then cut in half, marking one half "A" and the other half "B." The four pieces comprising lot A are then accurately weighed together, cut into small pieces about ⅛ in. square, thoroughly mixed, and used for the determination of tin and lead. The four pieces comprising lot B are reserved for the analysis of base metal and the direct determination of coating as a check on the analysis of lot A.

A templet should be provided, made preferably from steel ⅛ in. thick and exactly 2 x 4 in. A scribe is used to accurately mark the sections to be cut. The templet is then used to subdivide the 2 x 4-in. specimens into two pieces, 2 x 2 in. The sections for analysis are then cut with tinner's shears.

[The original paper here gives the methods for determining the percentage of tin and lead.]

DIRECT DETERMINATION OF THE WEIGHT OF COATING

The remaining four pieces, representing lot B, are used for the analysis of the base metal and incidentally can be used for the direct determination of the weight of coating.

The four 2 x 2-in. pieces are carefully weighed together and each piece is wrapped with a stiff platinum or nickel wire in such a manner that it may be placed in the acid in a horizontal position. Heat 60 c.c. of concentrated sulphuric acid contained in a 400-c.c. Jena glass beaker to at least 250 deg. C., immerse each piece separately in the hot acid for exactly one minute, and remove to a 600-c.c. Jena beaker containing 50 c.c. of distilled water. Immerse momentarily and rub the surface while washing with about 50 c.c. more of distilled water, using a wash bottle for this purpose. The four samples are thoroughly dried, reweighed, and used for the analysis of base metal.

The loss in weight represents the coating and some iron. The sulphuric acid contained in the 400 c.c. beaker is cooled and combined with the washings in the 600 c.c. beaker. Two hundred cubic centimeters of concentrated hydrochloric acid are added and the solution boiled for a few minutes. The solution is cooled, poured into a graduated 500 c.c. flask and filled to the mark with distilled water.

Determination of Iron.—Place 100 c.c. of this solution in a 300-c.c. Erlenmeyer flask, add one c.c. of a saturated solution of potassium permanganate to oxidize the iron and tin, heat to boiling and reduce with a few drops of stannous chloride. Cool, pour into a liter beaker containing 400 c.c. of distilled water, add 25 c.c. of mercuric chloride, followed by 10 c.c. of phosphoric acid and manganese-sulphate solution and titrate with 1/10 normal potassium permanganate.

The Calculation.

Four pieces 2 by 2 in. weigh	28.5686 g.
Same after stripped in acid	24.1620 g.
Loss, coating plus iron	4.4066 g.
Iron as found by titration	0.4887 g.
Weight of coating	3.9179 g.

$$3.9179 \times 8.6421 = \text{number of pounds per case of 112 sheets, 20 by 28 in.}$$

$$\frac{\text{Tin in 100 c.c.} \times 5 \times 100}{\text{Weight of Coating}} = \text{percentage of tin.}$$

$$\frac{PbO_2 \text{ (in 100 c.c.)} \times 0.866 \times 10 \times 100}{\text{Weight of Coating}} = \text{percentage of lead.}$$

In the analysis of tin plate, the weight of coating is expressed in pounds per box, which is a half case, or 112 sheets, 14 x 20 in.; hence to obtain the weight of coating per box on tin plate, the number of pounds as obtained above is divided by 2.

CONCLUSIONS

We claim for this method that the sample shows a true average of the coating on the plate, since we have checked the coating very closely by this method and by sampling from the center of the sheet, even with such large samples as 10 x 10 in. When 5 g. of the sample are taken for the determination of tin, an area of about 2.5 sq. in. is repre-

*Portion of a paper presented at the seventeenth annual meeting of the American Society for Testing Materials, Atlantic City, N. J., June 30 to July 3.

†American Rolling Mill Company, Middletown, Ohio.

sented in the case of 40-lb. IC plate, and of about 3 sq. in. in the case of 25-lb. plate; while, of course, it is double this in the determination of lead. Furthermore, the amount of sample taken here for analysis is a representative quantity from 16 sq. in. and not merely from one particular section of 2.5 or 3 sq. in.; and is as large as many laboratories are using and larger than most are using.

In addition, we believe that this method is more truly average than any method we have investigated, and moreover, the sheet is not destroyed so far as usefulness is concerned, but may be sheared down to a smaller size. While it is not necessary to determine the weight of coating directly by the sulphuric acid method, in addition to the determination of the lead and tin (on lot A), it will, however, serve as a check, and should agree very closely with it. Furthermore, this is an excellent method for stripping the coating preliminary to the analysis of the base metal.

By running the determination of tin in triplicate, as described in the paper, the method is very rapid and accurate, whereas the method as now used by many laboratories in which the plate is dissolved in an atmosphere of carbon dioxide in a graduated flask, cooled, diluted to volume and titrated in aliquots, involves many details and is not so rapid. In this method also, no antimony is needed for the reduction of tin, since the iron in the base metal accomplishes this; moreover, in the presence of the quantity of tin here involved the antimony would have a tendency to deposit back on the plate, retarding the solution of the tin and thus giving low results. With the use of a rotating anode the proposed method is very rapid and the entire determination can be finished in a reasonable length of time.

Motor-Driven Disk Grinding Machine

Charles H. Besly & Co., 118 North Clinton street, Chicago, Ill., have developed an improved type of direct-connected motor-driven disk grinding machine. One of the particular features about the machine is the lubrication of the radial and thrust bearings which is accomplished by a ring oiling system instead of using grease as was the former practice. In the design of the machine special care has been given to the construction of the spindle and its mountings.

Special end casings having large bearings for disk grinding machine service are provided for the motor. Crucible machinery steel is used for the shaft of the rotor instead of mild steel. The bearing bushings, which are 6 in. long, are of cast iron, lined with bearing metal and are ground on the outside and fitted into bored and reamed holes in the end casings of the motor. In this way it is possible to insert new bearings when necessary without affecting the alignment of the spindle, which is 2 in. in diameter and 29½ in. long and is 40 in. above the floor. The end thrust of the spindle in both directions is taken on hardened and ground tool steel thrust collars of large area, running at each end of the right-hand bearing bushing. An adjusting collar threaded on the spindle provides for the taking up of end play on these collars. The advantage claimed for this construction is that the natural heating of the bearing while running does not have a tendency to tighten the bearing and cause it to stick, as the longitudinal expansion from the heat is greater in the spindle than in the bushing, although the expansion of both parts is practically uniform, and there is no appreciable change in the adjustment on account of temperature changes.

The machine is driven by a 7½-hp. fully inclosed alternating-current motor. When operating on 60-cycle current, disk wheels 20 in. in diameter are operated at a speed of 1200 r.p.m.; with 25-cycle current, the machine runs at 1400 r.p.m., and the wheels are 18 in. in diameter. A single-throw

An Improved Direct-Connected Motor-Driven Grinding Machine with a Special Arrangement for Lubricating the Bearings

switch mounted inside the base casting controls the starting and stopping of the motor.

Any of the customary types of work table can be used with the machine, but in the accompanying engraving the equipment consists of a geared lever feed table at the right and a plain tilting table at the left.

British Iron and Steel Exports Are Still Decreasing

The iron and steel exports of Great Britain for the first six months of 1914 show a decrease both in tonnage and values from 1913. The total sent abroad to July 1, 1914, excluding iron ore and scrap, was 2,386,294 gross tons against 2,504,994 tons in the first six months of 1913, the decrease being 118,700 tons. The decrease in values was £2,563,547, or from £27,932,692 to £25,369,145. In pig iron, including ferroalloys, the decrease in exports was 34,976 tons, the total to July 1, 1914, being 511,380 tons against 546,356 tons. The exports of galvanized sheets were 379,739 tons, or 1,111 tons greater than for the first six months of 1913.

Imports of iron and steel, excluding iron ore and scrap, to July 1, 1914, were 1,104,312 gross tons against 1,177,380 tons to July 1, 1913, a decrease of 73,068 tons. The value for these two periods were £7,602,460 and £7,762,575, respectively, a decrease in imports of £60,115 as compared with last year.

The plant of the Thurlow Steel & Forging Company, Chester, Pa., is now in operation. It is equipped for the manufacture of steel forgings weighing from 1 to 10,000 lb., and the forge shop equipment includes a 1000-ton forging press for heavy forgings and die work; a heat treating plant, a machine shop for both rough and finished machining, especially on crankshaft work. The plant can manufacture forgings of machinery steel, nickel steel, nickel chrome steel and vanadium steel. It is under the management of John I. Rogers and Daniel C. Eagan, who operate the steel foundry at Crum Lynne, Pa., of the Eagan-Rogers Steel & Iron Company.

Schooling for the Entire Organization*

Vocational Guidance for the Salesmen, Office Employees and Shop Apprentices—The Possibility of Instructing Employees in General

BY E. ST. ELMO LEWIS†

About five years ago we decided to train our salesmen right. Before that time it was customary to bring them in once a week or oftener for "joy feasts," and when they had feasted they told each other good stories and experiences. We got a certain amount of good out of these, but the benefits were indefinite, untraceable, and didn't seem to increase the efficiency of those who didn't know. We decided to inaugurate a definite course of instructions for salesmen and we called it a school of salesmanship. We admitted it was a school! Some of our salesmen didn't agree with us that they should go back to school. Some were bold enough to intimate that they were born salesmen, anyhow, that all real, successful salesmen were born with the art of selling.

The first thing we did when we started that school was to get a teacher. Of course, the only kind of a man to put to teaching a sales school is a very successful salesman, a man who has made his mark, a man who is a star man. The kind of a man the new men will look up to.

We fell down there, most manufacturers fall down there. They give sales schools into the hands of a glib and successful salesman who knows a lot of disjointed and undigested facts about selling, or, to a man who is a thinker but who can't get his thoughts to the salesman. I have seen both of these types fail. They do not know how to lay out a course of study—they play too much popularity with the men on the one hand, or are indifferent to the teaching requirements of school practice. Kindergarten principles have to be applied, because salesmen by the time they are 25 or 50 years of age, have either forgotten or never knew how to study.

REQUISITES FOR A SUCCESSFUL SCHOOL

We find that the first requisite for a successful school for salesmen is the selecting of the right man to teach them. The second requisite is a plan of action; how to get the salesman to attend the school; then, after you've enticed him there, how to teach him and what to teach him.

When our school was first started we came in contact with the mulish nature found in the make-up of some salesmen. They dared us to teach them. After we got them coming once, we had a job to stop them. The first year of the school we offered to pay the railroad fare of the salesmen who wanted to attend. We have changed our plan now and pay the hotel expenses besides allowing a certain amount for incidental expenses. We believe a salesman should make some sacrifice, of his time at least, if he is to derive any benefit from the school.

I remember one case where one of the salesmen, the mulish natured kind, was almost forced by the district salesmanager to attend a session of the school at our plant. Well, after he got back in his territory he wrote the manager these words: "I am back in my territory with my fighting clothes on and am ready to start something (and he did) in my end of the state. The school is the finest thing I ever attended and it is worth any man's time and money even if the entire expense were charged to him. I wish to thank you for compelling me to go."

Letters like this, we publish in our sales bulletin so that other salesmen afflicted with the "You-can't-teach-me-anything" disease will wake up to the fact that others like him have come away from the school with a better understanding of things.

Not every salesman is allowed the privilege of attending school. First he must have had several months' experience in the field. He must prove that he has some aptitude for selling, that he is good material for our business before his application, which, by the way, has to be OK'd by his district manager, is considered. Also each class is limited to fifteen members.

I believe each class in a school should be started by a talk from the general manager about the firm, its history and present outlook. Such a talk makes a mighty good impression on the salesmen. Another important part of the programme is the trip through the plant or store. Here the man can get an idea of how the product is made and handled, and during his trip he meets and talks with men who supervise the making of the product. Such a trip makes the salesman think of some one else besides himself. Here's what one man wrote to me after he had gone back to his territory:

"My trip through the factory gave me a much better idea of how our machines are made and I was surprised at the size of our own factory, and the great number of departments. Also the many automatic machines for making many of the parts. I will be able hereafter to give prospective buyers a better idea of how our product is made and the company which makes it."

Experience meetings play an important part in the sales schools programme. Each man tells the other his methods, from start to finish, of landing the order. This gives the instructor an opportunity to find out the individual weaknesses of salesmen.

You can teach him much about the product by analyzing and bringing out its superior qualities, by relating instances of the devices of old salesmen, and letting salesmen who have sold against the company tell of the real work they had to put up in order to get the business.

TRAINING OFFICE EMPLOYEES

In establishing a school for our office workers, we followed the advice once given for establishing a corporation school: "Get first a teacher and let him learn your business. A man can learn the essentials of the business in months, but it takes years to train a teacher." A man was secured as instructor who had taken his literary course in Colgate University and his pedagogical and commercial training in New York University. He had taught five years in high schools and had been several years in office work.

We decided that the first work should be done on the correspondence, with both those who dictate and those who transcribe. The instruction has

*From a paper presented in a bulletin of the National Association of Corporation Schools.

†First vice-president of the National Association of Corporation Schools, and advertising director of the Burroughs Adding Machine Company.

been enthusiastically received, and every possible effort is made toward improvement. With the dictators, we began by an attack on the time-worn verbiage of correspondence language. Not only was that jargon inexpressive, weak and stiff, but it was hampering the thought of its users. Forms were tending to take the place of definite mental activity. These forms are being steadily supplanted by English of the present time which makes its appeals and statements strong and definite. No lack of courtesy is permitted; the letters must be cogent and contain as much personality as can be put into them.

The coming of the instructor was known for some time before his arrival, and the correspondents began to give more serious thought than usual to their work. When he did arrive, the knowledge that he was likely to read and criticise the correspondence had a very wholesome effect. The instruction to dictators had been chiefly by means of multigraphed bulletins and by personal conferences. The bulletins have drawn attention to the more striking and common faults in the use of English and have shown the correct usages with the reasons for them.

Each day the instructor reads a certain proportion of the letters, notes the difficulties which have arisen, and confers with those writers whose correspondence has been read. These personal conferences take time, but they bring home the faults and their solutions to the writers in a definite way that could not be attained by general assembly talks.

From their individual discussions is developing a greater thoughtfulness in the construction of letters, increased care in the dictation and the arrangement of the ideas, and a very marked gain in conciseness. We are working toward that ideal communication which states its message in the fewest words that will convey the thought clearly, correctly and courteously. The change in the work of the dictators is well shown by a remark made recently by one of the older men to the instructor: "When I go over some of the old carbons I find myself changing them with my pencil. I'm ashamed of those old, stiff forms, you know." We are planning to give a course of talks on business letter writing, which discussions will cover the principles of effective commercial correspondence. Examples from the daily work of various correspondents will be used to illustrate the talks.

With those who operate typewriters, the instructions, of course, are applied specifically to the more mechanical side of correspondence. The correct placing of the various punctuation marks is taken up very thoroughly, and the output is watched to see that the principles are properly applied. The modern or open style of punctuation is preferred to the older plan of putting marks at every possible place.

Capitalization with special Burroughs applications receives the attention necessary to insure the proper placing of capitals. One aim is to hold the number of rules to a minimum; so, many of the hairsplitting refinements of the stylists are left outside our instruction.

The operators receive training in the correct grammatical use of the various parts of speech. This instruction is given in an incidental way and from cases which arise in the work from day to day. We endeavor to keep as far as possible from the dry bones and deadening rules of the scholastic grammarians. The need of the principles appears in the work; they are then taught by application to the specific case, and in the language of the office rather than in that of the schoolroom. Dictation is taught in a similar way that the operators may be able to detect and correct slight errors in the letters given them.

Most of our operators come to us with the sight typewriting experience, which they have picked up in schools and elsewhere. Some were taught in schools the correct method of typewriting; but because of lack of confidence in their fingering, many have dropped into what they consider the slower and surer sight writing.

The sight method and the use of only one or two fingers on each hand are such wearing ways of writing and so wasteful of time that we are training the operators in the touch method of typing. The approach to this method is made on the theory that this way of writing will make the work easier for the operator. The increased speed which inevitably comes from touch writing is left to their imaginations.

RESULTS OF TRAINING

The increased respect which the dictators are giving the work of the operators and their judgment in the mechanical parts of a letter is steadily increasing in the operators the respect for and pride in their work. These feelings in turn are producing a quality of output which is improving steadily. By the training, the quantity of output is also increasing. Training office employees pays both in quality and quantity of work done; it pays too in the improved spirit with which they render their services.

APPRENTICESHIP SCHOOLS

About 20 boys are employed in the Burroughs factory as apprentices all the time. These boys are signed between the ages of 16 and 18 and are required to have at least a common school education.

A thorough course in such work as will enable the apprentice to learn the machinist trade is given under the direction of the department foreman, supervised by a special instructor. The foremen are required to report at the end of each week the apprentices' standing to the special instructor, who compiles these statistics. This course covers a period of four years.

Apprentices are paid while serving their time as follows: Eleven cents per hour the first year, 13 cents the second year, 15 cents the third year and 17 cents the fourth year.

In addition to the wages paid during service, each apprentice who completes the full time is given a bonus of $100 by the company.

In order to supplement the work in the shops, Burroughs apprentices have impressed upon them the necessity of attending night school, or taking up a course in some good correspondence school. Advanced apprentices are allowed to attend half-day sessions once a week at one of the daytime continuation classes conducted at one of the local schools. The time employed in school work represents a regular part of the time required to complete the apprenticeship course, and apprentices are allowed full pay while attending school.

This supplementary instruction includes subjects of mechanical drawing, elementary shop mathematics and shop science. The principles of construction are adapted to the special needs of the industries in which the boys are employed. Four and one-half hours in school are allowed each apprentice each week.

The work in the shops and the work in the schools is made as comprehensive as possible. Apprentices are impressed with the fact that hard work and study are necessary, if they would be

successful in their chosen line of work, and it is a point in favor of the system that 75 per cent of all the boys who start the service complete it and become skilled workmen.

The apprentice system has several distinct advantages, both to the employer and to the employee. The employee is more thoroughly trained and put in the position of being able to command more wages. A higher class of more ambitious boys is attracted by the opportunity to learn a good trade. The mutual agreement and understanding between the employer and the employee forms a strong bond between them and the prospect of advancement is a strong incentive to the boy to stay with the company after his term of apprenticeship is completed. About 25 per cent. remain in the company's employ.

The Burroughs Company has proved to its own satisfaction, at least, that employees in any department can be trained to handle their work more efficiently, and it is the intention of the officials of the company to extend the work of instructing employees just as fast as circumstances will permit.

NOISE FROM VENTILATING FANS*

Experiences in Its Reduction or Elimination in Operation

BY R. W. PRYOR, JR.†

As there does not seem to be any law which could be laid down to govern oneself on the installation of ventilating machinery, I will endeavor, in presenting this paper, to illustrate some different phases of the subject with the remedies used to correct the trouble. Below are given some experiences: A 60-in. steel plate fan with overhung blast wheel was operating in a concreted basement. This basement was walled-in in a substantial manner, and entering into where the fan was located were some conduits. The fan was operating at a pressure of something over 1 oz. and there was no perceptible noise in the immediate vicinity of the fan. However, about a half a block away there was a decided rumble, which was traced to the operation of this fan. The fan was covered with 6 in. of hair felt. This helped to deaden the sound somewhat, but did not entirely correct it. It seemed as though the fan or something started a vibration of the air in this chamber, the sound of which was projected or carried through the conduit tubes to the location where the sound became audible. I believe this is one of the most elusive problems the engineer has to contend with.

Another instance was the case of two 24-in. motor-driven propeller wheels, which were located in the rear of a bank, discharging the air into a brick areaway. These fans made a howling noise, which might be termed windage. Due to the air rushing through the blades, the fact that they discharged into this brick areaway, aggravated the condition. These propeller wheels were changed to flat blade type, the speeds being approximately the same in either case, but the amount of air handled by the flat blade wheel is about 75 per cent. of that handled by the curved blade. The result was, that the improvement was very noticeable and the noise practically eliminated. The speed of the first fan, and the velocity of the air through it, was too great for the size of the areaway and the sound was the result of vibrations due to the high velocity in a confined space.

In a building consisting of a hall approximately 48 x 54 x 17 ft., with an open attic space above, there was located a 36-in. disk wheel with a direct-connected single-phase motor running at 600 r.p.m. This fan had no immediate connection with any duct work, being mounted on a special steel support held firmly in the brick wall. This fan, drawing on the attic space, effected its ventilation of the hall through openings leading from the hall into the attic space. The hum from this outfit was so objectionable that the apparatus could not be used. The location of this outfit was subsequently changed so that it did not pull its air through quite so great a distance, thereby changing the proportion of the cubical contents through which it was drawing to the volume of air handled. The outfit was supported in a similar manner as before, and to one of the same brick walls; the same material being used as far as possible to make the change, and the fan running in the new location gives the desired ventilation without the noise which was so objectionable. This seems to bear out the theory that we have to consider the question of sound produced by the vibration of the air independent of the sound produced by the friction of the air against the walls of the duct. I think this condition is further exemplified by the fact that sound travels approximately 61,000 ft. per min., which in ventilating systems, such as we have been considering, gives the velocity of sound anywhere from 60 to 100 times greater than that at which the air is traveling.

This resonator effect is one that there does not seem to be any way of anticipating or predetermining, making it necessary to resort to a cut and try process.

Before leaving this part of the subject, I want to cite one more instance where there was an installation, for ventilating an auditorium, of two 30-in. propeller wheels with direct-connected 1-hp. direct-current motors, operating at 600 r.p.m., the outfits being installed in the duct work, and bolted to a brick wall by lag screws and ½-in. rubber washers. The ducts were provided with flexible canvas connections 8 in. long, so that there would be no metallic connection to conduct vibration, if the fan should produce any—and on the outlet side of these fans, where they discharged into a brick flue, they were provided with a galvanized iron sweep to turn the air without shock. These wheels were so noisy that it was impossible to run them over 400 r.p.m., at which speed they did not give enough air to properly ventilate the room in question. The noise at 600 r.p.m. was about like a planing mill exhauster running at 3-oz. pressure. After trying several remedies, the fans were pulled out, and there were installed in their place two 80-in. full housed fans, each belted to 1-hp. motors, the fans running at about 170 r.p.m. The same duct work throughout was used, and the volume of air delivered was slightly increased. The trouble was absolutely corrected. These new fans were placed slightly nearer to the auditorium than were the propeller wheels; but the motors were placed outside of the duct work; so, the combination which originally produced this noise was completely changed.

I cite another case of some small volume exhausters which were running at 1200 r.p.m. with direct-connected motors, and for which we substituted 40-in. steel plate belted fans at 480 r.p.m. In this case more air was handled than before with complete elimination of noise.

In these various illustrations, I would say that the disturbance in each case was caused by air vi-

*From a paper, substantially in full, presented at the recent semi-annual meeting of the American Society of Heating and Ventilating Engineers in Cleveland

†Consulting engineer, New York City.

erations rather than any mechanical defect. Mechanically these various outfits were above criticism. There are some factors which are important, such as the number of turns or the revolutions of the fan wheel, whether the motor is in the air travel or not, and the swish or rushing noise due to the air passing through duct work at high velocities and being deflected around elbows. Some motors more than others produce a magnetic hum, and if the motor is in the air current, this may prove objectionable. The spokes of a fan wheel revolving at a rapid rate, interfering as it does with the air current, give a rushing sound to the air.

Methods of insulating and deadening units are of importance, and on small direct-connected ventilating sets I have used with success a cast-iron unit bedplate containing the fan and motor, this bedplate being approximately 2 in. high and having sufficient weight in it to hold the outfit firmly without bolting. This bedplate is then mounted on about 2 in. of hair felt. Another form of setting for fans located on the upper floors of buildings is to place the fan on an 8-in. monolith of concrete completely surrounded with 2 in. of cork on the bottom and sides. This gives considerable weight to base in the monolith and absorbs any vibration, and the cork acts as the insulator.

The question of noise from thrust collars is one which very often causes trouble. The thrust collars on the fan shaft should be smoothly turned and should work against babbitted shoulders on the ends of the bearings. In some cases not enough attention is paid to this, with the result that there is a thumping noise, due to the unevenness either on the collar or the end of the bearing, particularly if the fan is a belted one and there is some inequality in the alignment of the belt.

The duct work is sometimes noisy, due to the air traveling through it at considerable velocity, especially if the duct work has not been properly braced. Furthermore, at high velocities it has been necessary to increase the resistance of duct work at elbows, due to the fact that the elbows furnished, while being theoretically and practically good elbows for the conveying of air, were of such angle as to deflect the air, creating a slap on the opposite side. In some cases good elbows have, of necessity, had to be spoiled in order to correct this, and I am informed that some of the engineers have used 1-in. hair felt covered with canvas on the inside of the ducts at places such as these to absorb the noises produced by the reflection of the air and where these corrections have been made, it has been necessary to increase the speed of the fan to obtain additional pressure to overcome the resistance.

A Record in Tin Mill Building

On Tuesday, May 26, the Jones & Laughlin Steel Company, Pittsburgh, started the building in its own foundries of 8 hot tin mills for its plant at Aliquippa. On Monday, July 13, these 8 hot mills were put in operation, so that the actual time from the starting of the building of the mills until they were put in operation, including Sundays, was 49 days, and this established a record for construction of this kind. The Jones & Laughlin Steel Company now has a total of 32 hot tin mills at its plant at Aliquippa, Pa., and all of these are now in operation. This company has the distinction of having the largest individual tin plate plant in this country.

The Northern Iron Company's Port Henry, N. Y., furnace will complete its run on a part burden of titaniferous ore next week when the lease of the MacIntyre Iron Company expires. It will be some time before the furnace will start up again.

Association of Iron and Steel Electrical Engineers at Cleveland

The following list of papers for presentation at the eighth annual convention of the Association of Iron and Steel Electrical Engineers, to be held at the Hotel Statler, Cleveland, Ohio, September 14 to 19, is announced:

Some Electrical Problems Practically Considered, by B. G. Lamme, Westinghouse Electric & Mfg. Company.

Statistical Data of Electrical Application in the Iron and Steel Industry, by R. Tschentscher, Illinois Steel Company, South Chicago.

Applications of Auxiliary Apparatus in Iron and Steel Mills, by Stewart C. Coey, Youngstown Sheet & Tube Company, Youngstown, Ohio.

Load and Use Factors as Applied to Motor Installations, by H. M. Gassman, Tennessee Coal, Iron & Railroad Company, Birmingham, Ala.

A Synchronous Condenser Installation for Power Factor Correction and Voltage Regulation, by W. O. Oschmann, Oliver Iron & Steel Company, Pittsburgh.

The Apprenticeship System as Applied to Steel Mills, by B. W. Gilson, Carnegie Steel Company, Youngstown, Ohio.

Cables and Accessories, by J. C. Bowman.

Underground Transmission in a Steel Plant, by F. D. Egan, Pittsburgh Crucible Steel Company, Midland, Pa.

Hot Metal Cranes for Steel Mill Service, by R. J. Mullally assistant superintendent, Brier Hill Steel Company, Youngstown, Ohio.

The Control of Induction Motors for Rolling Mill Drive, by Wilfred Sykes and G. E. Stoltz.

Magnetic Control Characteristics, by H. F. Stratton, Electric Controller & Mfg. Company, Cleveland.

A. C. and D. C. Magnetic Controllers for Auxiliary Motors, by W. O. Lum.

Switchboard and Switching for Steel Mills, by Saul Lavine, General Electric Company, Pittsburgh.

Machine Tool Drives, by Charles Fair, General Electric Company, Schenectady, N. Y.

Condensers and Their Auxiliaries, by R. N. Ehrhart, Westinghouse Machine Company.

Silent Chain Power Transmission, by F. L. Morse, Morse Chain Company, Ithaca, N. Y.

Organized Safety, by L. R. Palmer, Assistant Commissioner, Department Labor and Industry, Harrisburg, Pa.

High Candle-Power Incandescent Lamps for Steel Mill Illumination, by G. H. Stickney and A. B. O'Day.

Power-Transformer Construction for Steel Mills, by G. A. Waters, Wagner Electric Mfg. Company, St. Louis.

Watt-Hour and Ampere-Hour Meters and Their Application in Steel Mills, by R. C. Lanphier, Sangamo Electric Company, Springfield, Ill.

The Flaming Arc Lamp in the Iron and Steel Industry, by Allen T. Baldwin.

Decrease in German Pig-Iron Output for Six Months

Our Berlin correspondent writes that Germany's pig-iron production for the first half of the present year shows a falling off of 288,000 metric tons compared with last year. This decrease, however, is but three per cent., and in the circumstances, when one considers the existing depression, is negligible. This appears, too, from the fact that the production, which amounted to 9,288,214 tons, exceeded that of the same period in 1912 by 723,000 tons, and that of 1911 by 1,210,000. It is to be noted, however, that the reduction for June was 5 per cent., and that it seems likely that there will be an increasingly sharp restriction of production for the rest of the year. Stocks on hand are piling up and now amount to some 800,000 tons. This is in part due to a decrease in exports for the half year of about 100,000 tons.

The F. A. Godcharles Company, which for more than a quarter of a century manufactured cut nails at Milton, Pa., has decided upon a voluntary liquidation of its affairs. A meeting has been held at Philadelphia and plans agreed upon by which the business will be ended. Ex-State Senator Frederick A. Godcharles, of Milton, is the operating head of the company which in time past was a prosperous enterprise and paid many hundred thousands of dollars in wages.

ESTABLISHED 1855

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Politico-Mental Phases of Business

The political uses of prosperity news are being developed just now with much the same zeal that has been shown for months in exploiting industrial adversity. Where the effort is being made to show the purely psychological character of the depression current headlines tell, for instance, of a prosperity wave striking Pittsburgh and of "big orders for locomotives and structural steel giving work to an army of men." But the structural orders, when the details are scanned, prove to be some that were placed many months ago for the Hell Gate connecting bridge at New York and for the rebuilding of the bridge at Quebec, while the locomotive orders turn out to be what the Wabash Railroad Company has long considered but has not yet placed. Much news of like kind has been printed in the past week. The strained attempts to manufacture good times have given newspaper readers in the past week a sample of what may be expected as a daily performance when the Congressional campaigns are fairly under way. Along with the rest of it have come some fantastic proposals which recall the "Sunshine movement" of 1909. One of these is that leading business publications join in a campaign and simultaneously urge upon their readers the placing of large restocking orders within a given fortnight. The authors of this scheme do not show the manufacturers and jobbers who are supposed to engage in the furious buying between given dates, how they are to get into the hands of the ultimate consumer the wherewithal for acquiring parts of the stocks thus taken on; nor do they tell how to convince the consumer, even if he has the money in hand, that it is his patriotic duty promptly to give it up in exchange for merchandise. Right here is room for the play of a high and practical psychology—bringing many minds to a simultaneous conviction of the duty to buy.

Business needs every encouragement. Every legitimate influence, sentimental or otherwise, that can be enlisted upon the side of its revival ought to be brought to bear on the present situation. But nothing will be gained by trying to ignore or deny conditions that prevent recovery. That treatment was applied to business after the panic of 1907. There were those who asserted that the country could go forward again by saying so loudly enough, but to-day, nearly seven years after, there is wreckage of that panic that has not been cleared away.

It will do no good now, rather it will do harm, to ignore or deny the effect on business of legislative programmes, whether already carried out or announced as part of the policy of the administration. The President is credited with saying this week that business has now adjusted itself to the new tariff; that he had received no considerable protest against it or demand that it be changed; that none of the business men who have called upon him lately have intimated that they consider the Underwood act responsible for any general halting of business. Trade reports indicated to him that the tariff law had worked out exactly as planned.

The last previous significant uttterance we recall, concerning the Underwood tariff, was a plea of its sponsors that it be given time to work out its beneficent ends. They argued that the cost of living could not be brought down at once, but promised that relief would come in due time. Now we are told that the law has worked out as planned and that the adjustment of business has already taken place. In other words, the fruits of the new tariff are here and the country has not known it!

Without entering here upon a tariff argument, it should be said that there are evidences on every hand that the business men of the country by no means regard the Underwood tariff as a closed incident. On the contrary, very many of them agree with what the friends of that act urged some months ago, that more time is required for the development of its effects upon our industries. Half the voters of the country, probably more than half, believe in a tariff with some measure of protection. The majority of our manufacturers are protectionists and their policy in the past year has been in line with their convictions—they have waited for the promised developments.

Plainly a variety of causes produced the depression which has been dragging on for months. Many things have been laid at the door of the new tariff for which it is not responsible. But one thing is certain; the country took the framers of the act at their word when they said that its chief effect would be a lowering of prices. There could be nothing deadlier to business than such a general expectation of declining values. The mystery is that such pains should be taken now to deny the existence of a halt largely due to a perhaps too implicit faith in the promise of lower prices.

With depression at home and depression abroad there has been little chance to measure the effects of the new tariff. Exports have fallen off, as they might have done under the old tariff; but imports have increased, and in part the increase may be charged to reduced duties. Rightly or wrongly

many manufacturers believe that one effect of the Underwood duties, if they remain unamended, will be a reduction of wages in some industries.

If business men who have conversed with the President recently have not connected the present duties with the unfavorable conditions of business it is not because this revolutionary tariff is not blamed in greater or less degree. *The Iron Age* finds abundant evidence in the iron and steel and metal-working trades that manufacturers are acting upon the belief that the real test of the new tariff is not behind us but is yet to come.

Sheet and Tin Plate Production

The year 1912 was certainly the banner year in the sheet and tin plate industries. The year showed very large gains over the best previous year, averaging fully 25 per cent., while now come statistics of production in 1913, showing a loss from 1912 tonnages of about 11 per cent. in sheets and 14.5 per cent. in tin plate. The decreases last year represented a loss of ground relative to the iron industry as a whole, since pig iron showed an increase of 4 per cent. and steel ingots an increase of a fraction of 1 per cent. In the long run the sheet and tin plate industries have not lost ground; the fact is simply that the 1912 tonnages were abnormally large.

The tin plate industry has been building for a much larger production even than that of 1912. Last year two new plants were completed with a total of 16 mills. Last week an eight-mill addition to an old plant was put in operation, four mills are being added at another plant, and still another will shortly begin the erection of 18 additional mills. Here is an increase of 46 mills, equal to 14 per cent. of the total number of mills in operative condition in 1912, and even they were not operated in full throughout the year. Apart from the increase in the number of mills there is year by year an increase in the capacity of the individual mill, owing to better construction and mill practice.

In sheets there is a similar tendency to increase capacity, though not so marked.

The production statistics of the plate, sheet and tin plate industry for 1913, just issued by the Bureau of Statistics of the American Iron and Steel Association, involve such a departure in form from those of previous years that close comparisons cannot be made in some branches of the industry. For instance, the statistics of plates have hitherto included everything from 12 gauge down, whereas for 1913 the division is made according to the character of the mill, material under ¼-inch being included with plates (although separately stated), while the jobbing mill product, 12 gauge and thicker, is included with sheets. It is stated that the change in classification is made at the request of the producers, who doubtless find it more convenient to report in this manner.

Another change in classification is that there is included with black plates for tinning "all other black plate specialties rolled on tin mills." Such specialties are really sheet products, but it has always been difficult to secure a segregation of black plates actually tinned from the products of the tin mill which are not tinned.

To ascertain the product of what in the trade is regarded as sheets, one should deduct from the 1,030,629 tons of black plates and black plate specialties an estimate of 823,719 tons of black plates (this is the precise tonnage of tin plate reported) and add the difference, some 200,000 tons, to the 1,465,301 tons of 13 gauge and lighter black sheets reported as such, making a total of about 1,665,000 tons, which is comparable with 1,857,683 tons in 1912 and 1,358,110 tons in 1911.

The production of plates of 12 gauge and heavier was given as 3,035,200 tons in 1912. For 1913 it was 3,002,770 tons, in addition to which there was 252,337 tons of 12 gauge and thicker rolled on jobbing mills, making the amount which should be compared with the 1912 statistics 3,255,107 tons, or a gain of 7.2 per cent. The plate statistics show an interesting division between universal mill plates, sheared plates rolled on single stands of rolls and sheared plates roughed and finished on separate stands.

Pig Iron Requirements for Steel Making

The statistics of steel production in 1913, just announced by the Bureau of Statistics of the American Iron and Steel Institute, should tend to dispel the idea rather prevalent of late in many quarters that a largely increased outcome of old iron and steel scrap makes it unnecessary for the basic open-hearth steel furnaces to use as large proportions of pig iron as formerly. This belief has been harbored perhaps only upon the general theory that since the consumption of steel increased very rapidly in the past, so at this time the outcome of old material ought likewise to increase. The present statistics show that the trend is in the direction of larger percentages of pig iron being used, in proportion to total steel output.

The elementary comparison is that from 1912 to 1913 the production of pig iron increased by 1,239,364 tons to 30,966,301 tons, whereas the production of steel ingots and castings increased only 49,571 tons to 31,300,874 tons. This showing would not necessarily be conclusive, however, for the increase in pig iron might have been in foundry grades. The fact is, however, that the production of foundry and malleable iron increased only slightly while forge pig iron decreased. The increase in Bessemer, basic, spiegeleisen and ferromanganese was 1,057,340 tons, or a full million tons more than the increase in steel ingots and castings.

The statistics of Bessemer and low phosphorus pig iron harmonize fairly well with the statistics of production of Bessemer and acid open-hearth steel ingots and castings. In 1912 the production of the pig iron exceeded the production of the steel by 196,894 tons, the divergence being less than 2 per cent. of the total tonnage involved, while in 1913 the excess of pig iron was 792,374 tons, or about 7 per cent. of the tonnage involved. On the one hand, an excess of pig iron is required by reason of losses in making Bessemer steel, one single item being the loss of about 5 per cent. of carbon and silicon, while there is some Bessemer pig iron used in foundry work. On the other hand the acid open-hearth industry uses a large percentage of scrap, but this counts for little since the

total production of acid open-hearth steel is only one and a quarter million tons.

Statistics of the production respectively of basic pig iron and basic open-hearth steel, on the other hand, show a wide divergence by reason of the scrap employed in steel making. At the very first the proportion of pig iron to steel was large, some 60 per cent., but soon it decreased to about 40 per cent. and thereafter it increased. The proportions in the past three years have been: 1911, 58.0 per cent.; 1912, 58.1 per cent.; 1913, 61.6 per cent.

Thus, taking the basic open-hearth steel industry as a whole the latest statistics indicate a decrease in the proportionate consumption of scrap, and not an increase as is quite commonly believed.

It might be suspected, however, that there really was an increase in the consumption of scrap in the basic open-hearth steel process as commonly practised, the increase being concealed, in the total figures, by reason of the total including output of duplex metal. In the duplex process scrap is not essential, though it is sometimes employed in a limited way. Beginning with 1912 there are statistics of the production of steel by the duplex process, there being 1,438,654 tons in 1912 and 2,210,718 tons in 1913, an increase of 772,064 tons. To secure a fairly accurate concept of the conditions in the practice of the basic open-hearth process apart from the duplex, it is only necessary to deduct, both from the basic pig iron production and the total basic open-hearth steel production, these figures for the production of duplex steel, whereupon we find that the remainders show a proportion of 54.8 per cent. pig iron to steel in 1912 and 56.9 per cent. in 1913.

It is known that stocks of basic pig iron were larger at the close of 1913 than at the beginning; but even allowing for this it seems to be clearly established that the most recent trend has been in the direction of the pig iron proposition in basic steel increasing and that of scrap decreasing. Certainly there has been no definite trend in the opposite direction.

It does not follow, however, that the proportion of old scrap used is decreasing. In some quarters it is not realized that the bulk of the scrap used in the open-hearth steel process is not old material at all, but new scrap, produced within the steel plants, or in plants which fabricate rolled steel. The production of this new scrap, of course, is in relation to the total steel production, including Bessemer. In the early years the Bessemer steel industry was a great scrap feeder to the open-hearth, and in the case of some individual steel operations it still is. Thus in recent years two Bessemer steel interests at Youngstown have added open-hearth plants of less capacity than the Bessemer. Assume a case of a steel plant producing 600,000 tons of Bessemer ingots a year and 300,000 tons of open-hearth. Then if 20 per cent. of the ingot tonnage is converted into scrap in rolling and finishing, there is 180,000 tons of scrap, equivalent to 60 per cent. of the open-hearth ingot output.

The Bessemer steel industry, however, has been decadent. Its maximum production was in 1906 at 12,275,830 tons, while the open-hearth output in the same year was 10,980,413 tons. The Bessemer tonnage decreased to 9,545,706 tons in 1913, while the open-hearth increased to 21,599,931 tons. Necessarily the contribution of Bessemer steel scrap to the open-hearth decreased absolutely, while relatively it decreased very greatly.

We have good reason to believe that the production of new scrap is equal to at least 20 per cent. of the ingot tonnage produced. In 1906 such a proportion of scrap would have constituted no less than 41 per cent. of the total production of open-hearth steel ingots and castings. In 1913, by reason of the decreased production of Bessemer steel, the proportion was reduced to 28 per cent. A large part of this loss has been made up, undoubtedly, by an increased tonnage of old material, but not all of it, and it remains the case that the proportion of basic pig iron to basic steel has increased, and will probably increase further in future.

A very important question is here involved. In the construction, respectively, of blast furnaces and of basic open-hearth furnaces, has this fact been taken into account? There is much room for doubt. In the past few years blast furnace construction has been light and basic open-hearth furnace construction has been heavy. It is quite certain that if it were desired to operate all the steel-making capacity of the country there would not be found sufficient scrap and pig iron. Probably this precise contingency will not occur, there being hardly any prospect that the full Bessemer capacity of the country can ever be called into requisition, but even for a moderately full operation of the Bessemer capacity and a full operation of the open-hearth capacity it is very doubtful whether sufficient scrap and pig iron could be found except, perhaps, by drawing upon blast furnaces which are not now reckoned as possible producers of steel-making pig iron.

New Ingot Mold Foundry at Lebanon

On Thursday, July 16, a deal was closed at Philadelphia, Pa., between the Pennsylvania Steel Company, Steelton, Pa., and the Valley Mold & Iron Company, Sharpsville, Pa., by which the latter concern will erect a modern foundry at Lebanon, Pa., adjacent to the blast furnace of the Pennsylvania Steel Company, for the manufacture of ingot molds. For some years the Valley Mold & Iron Company has been shipping a large part of the requirements of the Pennsylvania Steel Company and the Maryland Steel Company, at Sparrows Point, Md., but there was a heavy freight charge involved, and to do away with this, and also to use a part of the pig iron made at Lebanon by the Pennsylvania Steel Company, the arrangement was effected. The iron made at Lebanon runs low in phosphorus, and is well adapted for the manufacture of ingot molds. Under the terms of the contract the Valley Mold & Iron Company will furnish ingot molds from its new foundry at Lebanon also for the Cambria Steel Company at Johnstown, Pa., instead of shipping as heretofore from Sharpsville.

The new plant is to have a capacity of 75 to 100 molds per day, or 6000 to 7000 tons of molds per month. The contract involves the furnishing of all the Bessemer pig iron to be used by the Pennsylvania Steel Company on a sliding scale basis for a period of 20 years, and the prices to be paid are on a sliding scale basis to be governed by weekly quotations in the market reports in *The Iron Age*. It is the intention to have the plant ready within 90 days. The Valley Mold & Iron Company will still continue to manufacture ingot molds at Sharpsville, but with the new plant at Lebanon the company expects to secure a good part of other Eastern trade in ingot molds.

MAY EXPORTS AND IMPORTS

Iron and Steel Tonnage Exports 41 Per Cent. Less Than a Year Ago—Imports Stationary

A decline in the total value of iron and steel exports for May of 26.2 per cent. and of 10.9 per cent. for imports, were shown by the May report of the Bureau of Foreign and Domestic Commerce. The values for May were only slightly less than those for April. The total value of the exports of iron and steel and manufactures thereof, not including iron ore, in May, 1914, was $19,734,045, as compared with $20,639,569 in April and $26,718,970 in May, 1913. The similar value for imports for May, 1914, was $2,835,290, against $2,893,280 in April and $3,181,597 in May, 1913.

The exports of commodities for which quantities are given totaled 139,110 gross tons in May, as compared with 161,953 tons in April and 234,343 tons in May, 1913. All the commodities, except wire rods, cut nails and steel sheets show a decline from the tonnages of a year ago. The increase in exports of wire rods is notable; 6767 gross tons being shipped abroad this May against only 896 tons a year ago.

Details of the exports of these tonnage commodities in May and the 11 months ended with May, compared with the corresponding periods of the previous fiscal year, are as follows:

Exports of Iron and Steel

	May		Eleven months	
	1914 Gross tons	1913 Gross tons	1914 Gross tons	1913 Gross tons
Pig iron	11,726	19,527	189,101	264,238
Scrap	3,411	7,235	66,684	97,206
Bar iron	359	1,126	9,967	22,267
Wire rods	6,767	896	44,117	69,520
Steel bars	10,151	18,240	137,979	214,705
Billets, ingots and blooms, n.e.s.	6,872	9,361	41,800	223,406
Bolts and nuts	1,401	2,381	18,491	19,456
Hoops and bands	977	1,120	10,763	17,146
Horseshoes	122	131	1,177	1,070
Cut nails	661	148	4,174	4,630
Railroad spikes	1,075	1,112	7,872	11,737
Wire nails	2,366	3,734	33,556	50,702
All other nails, including tacks	311	376	2,958	3,980
Pipes and pipe fittings	16,355	32,498	222,761	254,036
Radiators and cast-iron house heating boilers	358	599	5,134	7,835
Steel rails	15,659	32,097	325,452	407,971
Galvanized-iron sheets and plates	2,851	6,139	50,166	108,284
All other iron sheets and plates	805	2,155	10,430	29,867
Steel plates	8,463	21,988	151,289	241,487
Steel sheets	16,559	12,036	134,461	121,742
Structural iron and steel	14,772	37,382	280,449	328,901
Tin and terne plates	4,695	5,764	40,093	67,800
Barbed wire	5,337	7,488	73,051	81,419
All other wire	7,062	10,810	77,420	125,920
Totals	139,110	234,343	1,939,345	2,775,326

In May the imports of commodities for which quantities are given totaled 28,170 gross tons, against 30,594 tons in April and 28,726 tons in May, 1913. Imports of pig iron, steel billets and steel rails were considerably in excess of similar imports in May, 1913. In most other cases the imports declined from the figures of a year ago. Details of the imports of these commodities in May and the 11 months ended with May, as compared with the corresponding periods of the previous fiscal year, are as follows:

Imports of Iron and Steel

	May		Eleven months	
	1914 Gross tons	1913 Gross tons	1914 Gross tons	1913 Gross tons
Pig iron (including ferro-silicon)	.....	13,795	*38,892	141,663
Ferrosilicon	678	.....	†3,326	.....
All other pig iron	16,504	.....	†84,586	.....
Scrap	997	2,198	29,656	35,494
Bar iron	855	2,939	20,204	27,328
Structural iron and steel	573	1,398	9,925	6,260
Ingots, blooms and steel billets	.....	2,292	*6,317	18,759
Steel billets without alloys	90	.....	†3,335	.....
All other steel billets	2,494	.....	†24,346	.....
Steel rails	2,189	781	13,237	4,427
Sheets and plates	464	500	2,855	3,557
Tin and terne plates	2,668	2,862	21,641	4,927
Wire rods	658	1,961	10,860	14,907
Totals	28,170	28,726	269,180	257,322

*Figures cover period from July 1 to October 3, 1913, inclusive.
†Figures cover period since October 3, 1913.

The total value of the exports of iron and steel and manufactures thereof, excluding iron ore, for the 11 months ended with May, was $232,552,719, as compared with $279,377,451 for the same period a year ago. The value of the imports of iron and steel and manufactures thereof, not including iron ore, for the same period was $28,954,861, as compared with $30,344,483 for the same period in 1913.

The imports of iron ore in May were 125,659 gross tons against 111,812 tons in April, 68,549 tons in March and 191,860 tons in May, 1913.

The property of the Independent Steel Company, Kenova, W. Va., will be sold at special commissioner's sale August 7. The sale will be made on an order of the circuit court, which was sustained on final review before the supreme court on an appeal taken by the Rockwood Sprinkler Company. The first liens, after the mechanics' liens, are those of what is known as the syndicate, a group of Huntington, W. Va., capitalists who financed the enterprise. It is said certain interests are preparing to bid the plant in and use it as a manufacturing establishment of some kind, though not likely for steel.

The furnace of the Leesport Furnace Company, at Leesport, Pa., has not been blown out as reported. Operations were suspended for twenty-four hours for slight repairs.

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The Iron and Metal Markets

FOUR LINES MARKED UP

Wire, Plates, Shapes and Bars

Producers Found that 1.10c. no Longer Stimulated Business

No stir has been created by the announcements of $1 a ton advance in wire products and in bars, plates and shapes, which leading producers made in the past week, effective July 20. The wire advance was preceded by a fair amount of business at $1.50 for nails and $1.30 for plain annealed wire and better specifications on contracts at these figures may result from the marking up of prices.

The advances in bars, plates and structural steel, it is admitted, are not due to the coming in of any large volume of orders, such as ordinarily pushes prices up. The fact is that the 1.10c. basis was no longer in itself a stimulus to buying and it was believed as much business could be had at 1.15c. The leading producers in the Pittsburgh and Chicago districts took the initiative and various independent companies are now quoting 1.15c.

It is too early to say how far the new effort will succeed. Plates have been weaker at 1.10c. than bars and shapes and the competition of smaller mills and particularly on narrower plates may make more trouble there. The elimination of the low prices recently made on the three products for early delivery would undoubtedly help contract business at 1.15c. For fourth quarter sellers have for some time been asking $1 a ton more than for 60-day deliveries.

Business in finished steel in July has been somewhat larger, the Steel Corporation reports, than in June. Of independent producers some have done slightly better; others have found little difference on the whole. The Steel Corporation is now up to 70 per cent. in ingot production. An additional Carrie furnace and one at Duquesne have been blown in, and at Youngstown one more Ohio furnace is to go in this week.

Railroads are now ordering out from the mills all the rails they expect to lay in the construction period of 1914. The Southern Railway's order has been increased and the total amounts to 40,500 tons —29,000 tons to the Tennessee Company, 6000 tons to the Illinois Steel Company, 4000 tons to the Cambria Steel Company, 1000 tons to the Pittsburgh Steel Company and 500 tons to the Carnegie Steel Company.

The Canadian rail mill at Sault Ste Marie underbid American mills on 3000 tons of rails for the Toledo, St. Louis & Western, as recently reported, but only 1000 tons will be bought now and they will probably go to Pittsburgh.

Foreign mills which set out to get cotton tie business by promising to go under this year's price of domestic mills whatever it might be have cut a small figure in the trade. As has been seen in other steel lines, users preferred to buy at home and the foreign quotations did not cut deep enough to draw the business away.

The market for semi-finished steel continues drooping. A sliding scale contract for 18,000 tons of sheet bars, 1500 tons a month, has been closed. Some business has been done at $19.50, maker's mill.

The Illinois Central has bought 7000 tons of car channels, which at $2 a ton for punching, leave a price representing about 1c. on plain material.

The Tata steel mill in India, that is seeking to place an estimated surplus of 20,000 tons of rails in this country, has received a contract for 19,000 tons from the India State Railway, under the original guarantee of government tonnage.

Pig-iron markets are more discouraging as to prices than as to volume. An Indiana purchase of 18,000 tons of basic brought close competition from Toledo, Detroit, Columbus and Chicago, which have equal freights. The price was somewhat under $13 at furnace. At Buffalo 45,000 tons of pig iron for the East River tunnel segments was divided between two furnace companies.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

	July 22, 1914.	July 15, 1914.	June 24, 1914.	July 23, 1913.
Pig Iron, Per Gross Ton:				
No. 2 X, Philadelphia....	$14.75	$14.75	$14.75	$15.50
No. 2, Valley furnace...	13.00	13.00	13.00	13.75
No. 2 Southern, Cin'ti...	13.25	13.25	13.50	13.75
No. 2, Birmingham, Ala.	10.00	10.00	10.25	10.50
No. 2, furnace, Chicago*	13.75	13.75	13.75	14.75
Basic, del'd, eastern Pa.	14.00	14.00	14.00	15.00
Basic, Valley furnace...	13.00	13.00	13.00	14.35
Bessemer, Pittsburgh....	14.90	14.90	14.90	16.65
Malleable Bess., Ch'go*..	14.00	14.00	14.00	14.75
Gray forge, Pittsburgh...	13.65	13.65	13.65	14.40
L. S. charcoal, Chicago.	15.75	15.75	15.75	15.75
Billets, etc., Per Gross Ton:				
Bess. billets, Pittsburgh..	19.00	19.00	19.00	26.50
O.-h. billets, Pittsburgh..	19.00	19.00	19.00	26.50
O.-h. sheet bars, P'gh...	*19.50*	20.00	20.00	27.50
Forging billets, base, P'gh.	25.00	25.00	25.00	34.00
O.-h. billets, Phila.....	21.90	21.90	22.40	28.00
Wire rods, Pittsburgh...	24.50	24.50	24.50	28.00
Old Material, Per Gross Ton:				
Iron rails, Chicago.....	*12.00*	12.25	12.75	14.00
Iron rails, Philadelphia..	*14.00*	15.00	15.00	17.50
Carwheels, Chicago.....	11.25	11.25	11.50	12.75
Carwheels, Philadelphia..	11.00	11.00	11.00	12.00
Heavy steel scrap, P'gh..	11.50	11.50	11.50	12.25
Heavy steel scrap, Phila.	10.25	10.25	10.50	11.25
Heavy steel scrap, Ch'go	9.75	9.75	9.75	10.50
No. 1 cast, Pittsburgh...	11.50	11.50	11.50	12.75
No. 1 cast, Philadelphia.	12.00	12.00	12.00	13.00
No. 1 cast, Ch'go (net ton)	*9.50*	9.75	9.75	10.75
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia..	1.17½	1.17½	1.17½	1.42½
Iron bars, Pittsburgh...	1.25	1.25	1.25	1.65
Iron bars, Chicago.....	1.05	1.05	1.05	1.50
Steel bars, Pittsburgh...	**1.15**	1.10	1.10	1.40
Steel bars, New York....	1.26	1.26	1.26	1.56
Tank plates, Pittsburgh.	1.10	1.10	1.10	1.45
Tank plates, New York..	1.26	1.26	1.26	1.61
Beams, etc., Pittsburgh.	**1.15**	1.10	1.10	1.45
Beams, etc., New York..	1.26	1.26	1.26	1.61
Skelp, grooved steel, P'gh	1.15	1.15	1.15	1.45
Skelp, sheared steel, P'gh	1.20	1.20	1.20	1.50
Steel hoops, Pittsburgh..	*1.20*	1.25	1.25	1.60
Sheets, Nails and Wire,				
Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh	1.80	1.80	1.80	2.25
Galv. sheets, No. 28, P'gh	2.75	2.75	2.75	3.30
Wire nails, Pittsburgh...	**1.55**	1.50	1.50	1.70
Cut nails, Pittsburgh....	1.55	1.55	1.55	1.65
Fence wire, base, P'gh..	**1.35**	1.30	1.30	1.55
Barb wire, galv., P'gh...	**1.95**	1.90	1.90	2.20

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, **Connellsville,**

Per Net Ton at Oven:	July 22, 1914.	July 15, 1914.	June 24, 1914.	July 23, 1913.
Furnace coke, prompt...	$1.75	$1.75	$1.75	$2.50
Furnace coke, future....	*1.85*	1.90	1.85	2.50
Foundry coke, prompt...	2.25	2.25	2.30	2.75
Foundry coke, future....	2.35	2.35	2.50	3.00

Metals,

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	*13.75*	13.87½	14.12½	14.50
Electrolytic copper, N. Y.	*13.50*	13.62½	13.75	14.37½
Spelter, St. Louis.....	4.85	4.85	4.90	5.25
Spelter, New York.....	5.00	5.00	5.05	5.40
Lead, St. Louis.....	3.75	3.75	3.80	4.22½
Lead, New York.....	3.90	3.90	3.90	4.35
Tin, New York.....	**31.60**	31.50	30.75	42.00
Antimony, Hallett's, N. Y.	6.75	6.75	6.75	7.75
Tin plate, 100-lb. box, P'gh	*$3.25*	$3.30	$3.30	$3.60

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh, in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11c.; Cleveland, 10c.; Cincinnati, 15c.; Indianapolis, 17c.; Chicago, 18c.; St. Louis, 22½c.; Kansas City, 42½c.; Omaha, 42½c.; St. Paul, 32c.; Denver, 84½c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.15c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers with extras:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼-in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10....	.30
Gauges under No. 10 to and including No. 12..	.40
Sketches (including straight taper plates), 3 ft. and over	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel	.30
Marine steel	.40
Locomotive firebox steel	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.	1.00
Cutting to lengths, under 3 ft., to 2 ft., inclusive	.25
Cutting to lengths, under 2 ft., to 1 ft., inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.15c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.	.10
H-beams over 18 in.	.10
Angles over 6 in., on one or both legs	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail)	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909	.20 to .80
Deck beams and bulb angles	.30
Hand rail tees	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive	.50
Cutting to lengths, under 1 ft.	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, $1.35; galvanized, $1.75. Galvanized barb wire and fence staples to jobbers, $1.95; painted, $1.55. Wire nails to jobbers, $1.55. Woven wire fencing, 73½ per cent. off list for carloads; 72½ off for 1000-rod lots; 71½ off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

Plain Wire, per 100 lb.

Nos.	0 to 9	10	11	12&12½	13	14	15	16
Annealed	$1.50	$1.55	$1.60	$1.65	$1.75	$1.85	$1.95	$2.05
Galvanized	1.95	1.95	2.00	2.05	2.15	2.25	2.65	2.75

Wire Rods.—Bessemer, open-hearth and chain rods, $24.50 to $25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from April 20, 1914, and iron pipe from June 2, 1913, all full weight:

Butt Weld

Steel: Inches	Black	Galv.	Iron: Inches	Black	Galv.
⅛, ¼ and ⅜	73	52½	⅛ and ¼	66	47
½	77	66½	⅜	65	46
¾ to 3	80	71½	½	69	56
			¾ to 2½	72	61

Lap Weld

2	77	68½	1¼	56	45
2½ to 6	79	70½	1½	67	56
7 to 12	76	65½	2	68	58
13 to 15	53	..	2½ to 4	70	61
			4½ to 6	70	61
			7 to 12	68	55

Reamed and Drifted

1 to 3, butt	78	69½	1 to 1½, butt	70	59
2, lap	75	66½	2, butt	70	59
2½ to 6, lap	77	68½	1¼, lap	54	43
			1½, lap	65	54
			2, lap	66	56
			2½ to 4, lap	68	59

Butt Weld, extra strong, plain ends

⅛, ¼ and ⅜	68	57½	⅜	63	52
½	73	66½	½	67	60
¾ to 1½	77	70½	¾ to 1½	71	62
2 to 3	78	71½	2 and 2½	72	63

Lap Weld, extra strong, plain ends

2	74	65½	1½	65	59
2½ to 4	76	67½	2	66	58
4½ to 6	75	66½	2½ to 4	70	61
7 to 8	68	57½	4½ to 6	69	60
9 to 12	63	52½	7 to 8	63	53
			9 to 12	58	47

Butt Weld, double extra strong, plain ends

½	63	56½	½	57	49
¾ to 1½	66	59½	¾ to 1½	60	52
2 to 2½	68	61½	2 and 2½	62	54

Lap Weld, double extra strong, plain ends

2	64	57½	2	55	49
2½ to 4	66	59½	2½ to 4	60	54
4½ to 6	65	58½	4½ to 6	59	53
7 to 8	58	47½	7 to 8	52	42

To the large jobbing trade an additional 5 and 2½ per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		*Standard Charcoal Iron*	
1¾ and 2 in.	62	1½ in.	45
2¼ in.	59	1¾ and 2 in.	49
2½ and 2¾ in.	65	2¼ in.	45
3 and 3¼ in.	70	2½ to 2¾ in.	54
3½ to 4½ in.	72	3 and 3¼ in.	57
5 and 6 in.	65	3½ to 4½ in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

2¾ in. and larger, over 22 ft., 10 per cent. net extra.

Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets

	Cents per lb.
Nos. 3 to 8	1.30
Nos. 9 to 10	1.35
Nos. 11 and 12	1.40
Nos. 13 and 14	1.45
Nos. 15 and 16	1.55

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11	1.45 to 1.50
No. 12	1.45 to 1.50
Nos. 13 and 14	1.50 to 1.55
Nos. 15 and 16	1.55 to 1.60
Nos. 17 to 21	1.60 to 1.65
Nos. 22 and 24	1.65 to 1.70
Nos. 25 and 26	1.70 to 1.75
No. 27	1.75 to 1.80
No. 28	1.80 to 1.85
No. 29	1.85 to 1.90
No. 30	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11	1.75 to 1.80
No. 12	1.85 to 1.90
Nos. 13 and 14	1.85 to 1.90
Nos. 15 and 16	2.00 to 2.05
Nos. 17 to 21	2.15 to 2.20
Nos. 22 and 24	2.30 to 2.35
Nos. 25 and 26	2.45 to 2.50
No. 27	2.60 to 2.65
No. 28	2.75 to 2.80
No. 29	2.90 to 2.95
No. 30	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., July 21, 1914.

Effective Monday, July 20, the Carnegie Steel Company sent out notices to its sales managers and to the trade that its minimum price on steel bars, plates and shapes would be 1.15c., f.o.b. Pittsburgh, and this action has also been taken by the Jones & Laughlin Steel Company, the Cambria Steel Company and the Republic Iron & Steel Company, the last company, it is to be noted, not being a maker of shapes. On the same date, prices on wire products were advanced $1 a ton, putting wire nails at $1.55 and plain wire at $1.35, f.o.b. Pittsburgh. It is admitted that the advance in plates, shapes and bars is not a result of a large volume of new orders. The leading interest believed that something should be done to put the steel market on a better price basis than it has been for some time. The trade was not placing orders freely for plates, shapes and bars at 1.10c., and it is believed there will probably be as much material at 1.15c. as at the lower figure. It was also thought desirable to make the advance before the rate decision is announced, in order that there should be no grounds for saying it was influenced by the latter. The daily press in some of the large cities is inclined at present to exaggerate favorable conditions in the steel trade, and reports are being printed that the turn has been reached and the steel trade is on a much better basis. While it is true that sentiment is better sales managers of the leading steel companies report that this is not reflected in any increase in new orders and that on the whole the steel business is little better than it was in early June. It is probable the demand so far in July has been as heavy as in June, but this is not saying very much. In the case of the advance in wire products the large trade, as has been the usual custom, was allowed to cover its needs over the next 60 days or longer, and the mills report a more active demand for wire products. Pig iron is still the weak feature, the demand being dull and prices weak. The buying trade seems to lack confidence and is not placing orders ahead. Bessemer and open-hearth steel billets are held at about $19, and sheet bars at $19.50 to $20, Pittsburgh, but open-hearth sheet bars are being offered by the small mills at a lower price. Specifications on tin plate have fallen off, but the mills are pretty well filled up to September. Coke is dull and neglected, some furnaces desiring not to contract for last half under present conditions. The scrap trade is also neglected, and prices are only fairly steady. It is not believed there will be any marked betterment in the steel trade until late this year.

Pig Iron.—After the activity of a week or two ago the local market has quieted, but there is a fair amount of new inquiry. Basic and foundry iron are moderately active and the National Malleable Castings Company, Sharon, Pa., is credited with having bought 10,000 tons of basic from a Shenango Valley maker for delivery over last half of the year at $13, Valley furnace. A local radiator company has bought 1500 tons of No. 2 foundry for August, September and October at about $12.90, Valley furnace. A sale is also reported of 300 tons of Bessemer iron at $14, Valley furnace. Prices are fairly strong and we quote Bessemer $14; basic, $13; malleable, $13; No. 2 foundry, $12.90 to $13, and gray forge, $12.75, all at Valley furnace, with 90c. a ton freight rate for Pittsburgh or Cleveland delivery.

Billets and Sheet Bars.—One leading consumer is reported to have closed a contract for 18,000 tons of sheet bars over the next year, deliveries being 1500 tons a month commencing with July, with the price on a sliding scale basis. Prices on billets and sheet bars are only fairly strong, and open-hearth billets and sheet bars are being offered by several outside mills at lower prices than the larger makers will quote. We quote Bessemer and open-hearth billets at $19 to $19.50, and Bessemer and open-hearth sheet bars at $19.50 to $20, f.o.b. maker's mill, Pittsburgh or Youngstown. We quote forging billets at $25 for desirable orders of one size and up to but not including 10 x 10 in., regular extras being charged for larger sizes. On carload orders forging billets are held at $26. We quote axle billets at $23 for desirable orders and $24 for small lots, f.o.b. Pittsburgh.

Ferroalloys.—The market is quiet, consumers of ferromanganese and ferrosilicon being pretty well covered over the remainder of the year. New sales are mostly carload lots for prompt shipment. English 80 per cent. ferromanganese is held at $37.50 to $38, and German $37, Baltimore, the freight to the Pittsburgh district being $2.16 a ton. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at $73; over 100 tons to 600 tons, $72; over 600 tons, $71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is $19; 11 per cent., $20, and 12 per cent., $21, f.o.b. cars Jackson County, Ohio, or Ashland, Ky., furnace. We quote 20 per cent., spiegeleisen at $25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Muck Bar.—Local mills that roll muck bar are now paying the $5.50 per ton rate for puddling, an advance of 25c. a ton over the price prior to July 1, but as yet prices of muck bar are not any higher. We quote a sale of about 500 tons of muck bar from an outside district at slightly less than $27 delivered, Pittsburgh. We quote best grades of muck bar, made from all pig iron, at $27, Pittsburgh.

Structural Material.—New inquiries in the past week have been fairly active, and some jobs have been placed. The McClintic Marshall Company has taken a railroad bridge over the Susquehanna River at Nanticoke, Pa., 1200 tons, and also 5800 tons of third track elevated work in Brooklyn; the Jones & Laughlin Steel Company has taken 1200 tons for a new warehouse for the R. J. Reynolds Tobacco Company at Winston-Salem, N. C., and the Riter Conley Mfg. Company has 300 tons for the Davis theater in this city. The Hedden Construction Company is low bidder on the Public Service Corporation terminal at Newark, N. J., and if it secures the contract, the steel will be furnished by the Carnegie Steel Company. Local fabricators are much interested in the Kansas City bridge, 17,000 tons, and the bridge at Metropolis, Ill., 17,000 tons. It is expected that within a month or six weeks bids will be asked on about 15,000 tons of steel for local county buildings. The Carnegie Steel Company, Cambria and Jones & Laughlin are now all quoting 1.15c. minimum on beams and channels up to 15-in. and we quote the market at that price, f.o.b. Pittsburgh.

Plates.—Local makers are now quoting 1.15c. minimum on ¼-in. and heavier plates and state that already small sales have been made at that price. The new demand for plates is quiet, and orders for cars are scarce. The only active inquiry is that of the Southern Pacific for 4500 box cars, which is expected to be placed soon. We quote ¼-in. and heavier plates at 1.15c., f.o.b. Pittsburgh.

Steel Rails.—The Carnegie Steel Company will install at its Edgar Thomson steel works, Bessemer, Pa., rolls for making 120-lb. rails for the Pennsylvania Railroad order, the heaviest sections heretofore rolled at the Edgar Thomson works being 100-lb. The Carnegie Steel Company will furnish 22,000 tons of the Pennsylvania Railroad order, and the Illinois Steel Company the same amount. The new demand for light rails is fairly active, the Carnegie Steel Company having received in the past week new orders and specifications for over 2000 tons. We quote light rails rolled from billets as follows: 25, 30, 35, 40 and 45 lb. sections, 1.10c.; 16 and 20 lb., 1.15c.; 12 and 14 lb., 1.20c., and 8 and 10 lb., 1.25c., in carload lots, f.o.b. Pittsburgh. For large lots these prices might be shaded.

Steel Wheels.—Some fairly large inquiries are out for forged steel and cast iron wheels, but no large

contracts have lately been placed. We quote 33-in. engine truck forged steel wheels at $22 to $24; 36-in., $23 to $25; 33-in., tender wheels, $18 to $18.50; 36-in. passenger train car and tender wheels, $20 to $20.50, and 33-in. freight car wheels at $15.50 to $16, all f.o.b. Pittsburgh.

Skelp.—An inquiry for 15,000 tons of grooved steel skelp for foreign delivery is reported in the market, but none of the local makers states they have received it. The new demand for skelp is quiet and prices are only fairly strong. We quote: Grooved steel skelp, 1.15c. to 1.20c.; sheared steel skelp, 1.20c. to 1.25c.; grooved iron skelp, 1.50c. to 1.55c.; sheared iron skelp, 1.60c. to 1.65c., delivered to consumers' mills in the Pittsburgh district.

Wire Rods.—There is practically nothing doing in new sales and consumers are specifying only at a fair rate against contracts. Prices are said to be a little firmer in sympathy with the advance of $1 a ton on wire products. We quote Bessemer, open hearth and chain rods at $24.50 to $25, f.o.b. maker's mill, Pittsburgh.

Iron and Steel Bars.—Sales of steel bars by local makers to implement concerns and other consumers for third quarter and last half of the year delivery have been quite heavy. Part of this business for third quarter delivery was taken at 1.10c., and most of it for last quarter at 1.15c. or better. It is said the leading consumer has not yet closed for its needs in steel bars over last half of this year and first half of next year. The Carnegie, Jones & Laughlin, Cambria and Republic Companies are all quoting 1.15c. on steel bars for third quarter delivery, and state this is their absolute minimum. We quote the market at that price, f.o.b. Pittsburgh. We quote iron bars, made nearly entirely from muck bar, at 1.25c., f.o.b. maker's mill, Pittsburgh. Regular extras for twisting reinforcing steel bars over the base price are as follows: ¾-in. and over, $1; ½ to 11/16-in., $1.50; under ½-in., $2.50 per net ton. These extras are not always observed.

Hoops and Bands.—The advance of $1 a ton on steel bars also applies on steel bands, which are now held at the same price. New demand is quiet and only for small lots to cover current needs. Hoops are also dull, but an increase in specifications against contracts is looked for next month. We now quote steel bands at 1.15c., extras as per the steel bar card, and steel hoops at 1.20c. to 1.25c., the lower price being made on desirable orders.

Cotton Ties.—The Carnegie Steel Company expects to roll this year about 1,500,000 tons of cotton ties to supply its trade, and the price remains at 65c. per bundle.

Sheets.—The new demand for black and galvanized sheets is fairly active, and jobbers and consumers alike are anxious to place contracts for third quarter and last half delivery, but the mills as a rule are refusing to accept these, stating that at 1.80c. for No. 28 black and 2.75c. for No. 28 galvanized, there is little or no profit. The sheet mills are now running at a heavier rate than for some time, the American Sheet & Tin Plate Company operating this week close to 70 per cent. of capacity. We quote Nos. 9 and 10 blue annealed sheets at 1.35c.; No. 28 Bessemer black, 1.80c. to 1.85c.; No. 28 galvanized, 2.75c. to 2.80c.; No. 28 black plate, tin mill sizes, H. R. and A., 1.85c.; Nos. 29 and 30, 1.90c. The above prices are in carload lots, f.o.b. Pittsburgh, jobbers charging the usual advances for small lots from store.

Tin Plate.—The Jones & Laughlin Steel Company has started up eight new hot tin mills in its plant at Aliquippa, Pa., giving it a total of 32 hot mills, the largest individual tin plate plant in the world, and all of the 32 mills are in full operation. New demand is quiet and only for small lots, and specifications against contracts are not so active as they were some time ago. The Wheeling Sheet & Tin Plate Company has been taken over by the Wheeling Steel & Iron Company. Operations among the tin plate mills range from 75 to 90 per cent. of capacity. We quote 100-lb. 14 x 20 coke plates at $3.25 to $3.35, and 100-lb. 14 x 20 terne plates at $3.15 to $3.25, f.o.b. Pittsburgh.

Shafting.—This is the dull season in the shafting trade. None of the shafting makers is running at over 50 per cent. of capacity and some at less. We quote cold rolled shafting at 66 to 67 per cent. off in carload lots and 64 to 65 per cent. off in small lots, delivered in base territory.

Spikes.—The Baltimore & Ohio has placed an order with the Jones & Laughlin Steel Company for 4000 kegs of spikes for prompt shipment, and the Chesapeake & Ohio has bought 2000 kegs of the Tredegar Iron Company, Richmond, Va. Makers are expecting some business shortly from the Pennsylvania Railroad, in view of the order for 100,000 tons of rails lately placed by that road. A feature of the spike market is that when railroads place an order they want very quick shipments, this showing that they are buying for actual needs only. We quote standard sizes of railroad and boat spikes at $1.40, which is slightly shaded for large orders, and small railroad and boat spikes at $1.50 per 100 lb. in carload lots, f.o.b. Pittsburgh.

Merchant Steel.—New demand for all kinds of steels is light and only for small lots, the implement makers and other large consumers placing very few orders at present. Mills report unsatisfactory specifications against contracts. Prices are more or less shaded and on small lots for prompt shipment are about as follows: Iron finished tire, ½ x 1½ in. and larger, 1.30c., base; under ½ x 1½ in., 1.45c.; planished tire, 1.50c.; channel tire, ¾ to ⅞ and 1 in., 1.80c. to 1.90c.; 1⅛ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c. We quote cold-rolled strip steel as follows: Base rates for 1 in. and 1½ in. and wider, under 0.20 carbon, and No. 10 and heavier, hard temper, 3.25c.; soft, 3.50c.; coils, hard, 3.15c.; soft, 3.40c.; freight allowed. The usual differentials apply for lighter sizes.

Wire Products.—Effective Monday, July 20, the American Steel & Wire Company, the Jones & Laughlin Steel Company, the Youngstown Sheet & Tube Company and other smaller makers of wire and wire nails advanced prices on wire products $1 per ton. Following the policy prevalent in the wire trade for some years, it is understood that the heavy buyers were allowed to cover needs for 60 days or longer ahead prior to the advance. We quote wire nails at $1.55, plain annealed wire at $1.35, galvanized barb wire and fence staples, $1.95; painted barb wire, $1.55, all f.o.b. Pittsburgh, actual freight added to point of delivery, terms 30 days net, less 2 per cent. off for cash in 10 days. We quote steel cut nails at $1.55 to $1.60, f.o.b. Pittsburgh, in carload lots.

Nuts, Bolts and Rivets.—Makers report that buying is still for small lots, but nearly all consumers are covered for the third quarter and some for the last half. Demand for boiler rivets is reported slightly better, but for structural rivets only fair. Discounts on nuts and bolts are more or less shaded, depending on the order. We quote button-head structural rivets in carload lots at 1.50c., and in small lots at 1.60c.; cone-head boiler rivets, 1.60c. in carload lots and 1.65c. in small lots, with terms 30 days net, 2 per cent. for cash in 10 days. Discounts on nuts and bolts are as follows in lots of 300 lb. or over, delivered within a 20c. freight radius of maker's works:

Coach and lag screws	80 and 5% off
Small carriage bolts, cut threads	80% off
Small carriage bolts, rolled threads	80 and 5% off
Large carriage bolts	75 and 5% off
Small machine bolts, cut threads	80 and 5% off
Small machine bolts, rolled threads	80 and 10% off
Large machine bolts	75 and 10% off
Machine bolts, c.p.c. & t nuts, small	80% off
Machine bolts, c.p.c. & t nuts, large	75 and 5% off
Square h.p. nuts, blanked and tapped	$6.30 off list
Hexagon nuts	$7.20 off list
C.P.C. and r sq. nuts, blanked and tapped	$6.00 off list
Hexagon nuts, ⅝ and larger	$7.20 off list
Hexagon nuts, smaller than ½ in.	$7.80 off list
C.P. plain square nuts	$5.50 off list
C.P. plain hexagon nuts	$5.80 off list
Semi-fin. hex. nuts, ½ in. or under	85, 10 & 10% off
Semi-fin. hex. nuts, ⅝ in. and larger	85 & 5% off
Rivets, 7/16 x 6½, smaller & shorter	80, 10 & 5% off
Rivets, tin plated, packages	80, 10 and 5% off
Rivets, metallic tinned, packages	80, 10 and 5% off
Standard cap screws	70, 10 and 10% off
Standard set-screws	75, 10 and 10% off

Standard Pipe.—Jobbers and consumers buy only for actual needs and there are no stocks held by consumers. Oil country goods are fairly active. The directors of the Arkansas Natural Gas Company met on Wednesday, July 15, but decided to postpone for the present the buying of 54 miles of 16-in. line pipe for which it has been in the market for some time. The inquiry for 50 miles of 12-in. line pipe for Waco, Texas, has again been revived, but this has been up since last December. The Tri-County Gas Company is in the market for 12 miles of 10-in. plain end line pipe for delivery in northern Pennsylvania. Discounts on standard iron and steel pipe and oil country goods are being well maintained, but very low prices are being made on line pipe. The recent order for about 500 tons of line pipe for delivery to Huntington, W. Va., was taken at a remarkably low figure.

Boiler Tubes.—New demand for locomotive and merchant boiler tubes is only fair, and is for small lots to cover current needs. Little attention is paid to discounts on either iron or steel boiler tubes and they are more or less shaded, depending on the order.

Coke.—We note the closing by a Mahoning Valley furnace interest of 10,000 tons of furnace coke per month from July to December at $1.85 per net ton at oven. Some furnaces, whose contracts expired on July 1, have decided not to contract, but are buying from week to week, paying the spot price. The seller or buyer has the right to shut off shipments at any time. The coke market is soft and new inquiries are dull. Some buying of coke for August delivery by two or three furnaces is expected within the next week. Demand for foundry coke is only fair, as none of the foundries is running full, and some to less than 50 per cent. of capacity. We quote standard furnace coke for prompt shipment at $1.75 to $1.80 per net ton at oven, and on contracts for last half of the year, $1.85 to $2. Prompt foundry coke is quoted at $2.25 to $2.35, and on contracts, $2.35 to $2.50, all per net ton at oven. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ending July 11 as 264,605 tons, an increase over the previous week of 5353 tons.

Old Material.—It is said that some large consumers of scrap that have bought very little for some time are now taking more interest, but are not yet inclined to pay prices asked by dealers. There is fair activity in heavy steel melting scrap, borings and turnings. Prices are fairly strong, but without change. Dealers quote, per gross ton, for delivery to consumers' mills in the Pittsburgh and nearby districts that take the same rates of freight, as follows:

Selected heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	$12.00
Ordinary steel melting scrap	$11.50 to 11.75
Compressed side and end sheet scrap	11.00 to 11.25
No. 1 foundry cast	11.50 to 11.75
No. 2 foundry cast	10.25 to 10.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	8.25 to 8.50
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	12.75 to 13.00
No. 1 railroad malleable stock	11.00 to 11.25
Railroad grate bars	10.25 to 10.50
Low phosphorus melting stock	14.25 to 14.50
Iron car axles	22.50 to 23.00
Steel car axles	15.50 to 16.00
Locomotive axles, steel	20.00 to 20.50
No. 1 busheling scrap	10.25 to 10.50
No. 2 busheling scrap	7.25 to 7.50
Machine shop turnings	7.75 to 8.00
Old carwheels	11.25 to 11.50
Cast-iron borings	8.25 to 8.50
†Sheet bar crop ends	12.00 to 12.25
Old iron rails	13.75 to 14.00
No. 1 railroad wrought scrap	11.50 to 11.75
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	12.00 to 12.25

†Shipping point.

At the fifth annual graduation of the David Ranken School of Mechanical Trades, St. Louis, held July 21, certificates were given to 55 who completed full courses. Of this number 11 are machinists. The total enrollment for the year was 892, of which 243 were in regular day classes, 583 in evening classes and 66 in co-operative classes. The increase in enrollment over the preceding year was 170.

Chicago

CHICAGO, ILL., July 22, 1914.—(*By Wire.*)

An advance of $1 a ton to the basis of 1.33c., Chicago, for shapes, plates and bars, announced to-day by the Illinois and Carnegie Steel Companies, is an unusually interesting development of the market situation. It is not unlike the advance earlier in the year and follows bookings of a considerable tonnage at the lower prices by Jones & Laughlin Steel Company and the Carnegie Steel Company. Many other producers have failed to take as much business and it does not appear assured that the advance will be maintained, although one of the obvious purposes of the announcement is to exert a strengthening influence. The price of wire products has also been advanced $1 a ton. Inquiry during the past week has shown a substantial increase, many of the rank and file of consumers displaying some uneasiness lest they had delayed too long to get low prices in covering for their last half requirements. The producers' position appears somewhat stronger. The railroads are an important factor in the movement toward a healthier condition. Car inquiry continues good and reports of increased forces of men and longer working schedules in the railroad shops point to the earnest preparation for the fall crop movement. The Illinois Central placed 7000 tons of car channels. Pig iron buying though moderate in volume, is featureless.

Pig Iron.—Sales in the week offered few features and aggregated in volume only a moderate total. No tonnages of importance were under negotiation, about the only interesting development being the renewal of inquiry for malleable iron. Of this grade about 10,000 tons has been under consideration and a part of this has been placed. Malleable foundries have been out of the market for a long time and this inquiry reflects what is also true in the case of a number of gray iron foundries, the closing of last half castings contracts. There is only a moderate demand for charcoal iron. The Interstate Commerce Commission has postponed until October 1 the change in the rate on iron from the South. It is not expected that this will affect sales made for delivery beginning August 15. Much of the Southern iron purchased last week was on the basis of $10.25, Birmingham. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a local switching charge averaging 50c. a ton:

Lake Superior charcoal	$15.75 to $16.75
Northern coke foundry, No. 1	14.50 to 15.00
Northern coke foundry, No. 2	13.75 to 14.25
Northern coke foundry, No. 3	13.50 to 14.00
Southern coke, No. 1 f'dry and 1 soft	15.10 to 15.35
Southern coke, No. 2 f'dry and 2 soft	14.60 to 14.85
Malleable Bessemer	14.00 to 14.25
Standard Bessemer	17.00
Basic	13.25 to 13.50
Low phosphorus	21.00 to 21.75
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

(*By Mail*)

Rails and Track Supplies.—The railroads are now ordering out from mill all of the rails they expect to lay during the remainder of the construction season and a number of small lots have been placed. In most instances these orders are accompanied by substantial specifications for track fastenings. We quote standard railroad spikes at 1.50c. to 1.55c., base; track bolts with square nuts, 1.90c. to 2c., base, all in carload lots, Chicago; tie plates, $25.50 to $26, f.o.b. mill net ton; standard section Bessemer rails, Chicago, 1.25c., base; open hearth, 1.34c.; light rails, 25 to 45 lb., 1.25c.; 16 to 20 lb., 1.30c.; 12 lb., 1.35c.; 8 lb., 1.40c.; angle bars, 1.50c., Chicago.

Structural Material.—Some measure of the present situation may be taken from the placing of 7000 tons of car channels with Jones & Laughlin last week by the Illinois Central Railroad, delivery to extend through two years. While the extra $2 per ton allowed for punching will doubtless make a profit on the job, it is understood that the plain material price made for the first year was approximately 1c. base, with an advance of about $3 a ton for the second year. More car buying of importance is forecasted by the definite in-

quiry of the Chicago Great Western for 500 cars and of the Union and Southern Pacific for an aggregate of about 8000 cars. The demand for architectural steel is still below normal. The following contracts were placed in the week: 101 tons for the Commercial Acid Company, St. Louis, to Ruemmeli-Dawley Mfg. Company.; 119 tons for the Chicago Telephone Company, to the American Bridge Company; 115 tons for the Atchison, Topeka & Santa Fe to the American Bridge Company; 300 tons for the Calumet & Hecla Mining Company, Calumet, Mich., to the American Bridge Company; 276 tons for the Chicago, Indianapolis & Louisville at Bedford, Ind., to the Wisconsin Bridge Company; 286 tons for the Anaconda Copper Mining Company, Great Falls, Mont., to the American Bridge Company; 305 tons for the Salinas River bridge, Monterey Co., Cal., to the American Bridge Company; 243 tons for the United States Brewing Company, Chicago, to Hansell-Elcock; 1231 tons for the Calumet & Hecla Mining Company, to Riter Conley Mfg. Company. The market for plain material is firmer, the sales of the past week showing an increased disposition on the part of mills to hold to a minimum of 1.28c., Chicago, and to limit that price to third quarter delivery, although some quotations are noted as low as 1.25c. The advance of the leading interest to the basis of 1.33c., Chicago, emphasizes the firmer position of the mills. We quote for Chicago delivery, mill shipment, 1.25c. to 1.33c.

The volume of shipments out of store has scarcely held up to the expectations suggested by the situation at the beginning of the month. Prices are unchanged and we continue to quote for Chicago delivery 1.75c.

Plates.—The increase in the number of cars placed is relieving in a measure the famine of the plate mills and the special weakness which distinguished this market from that of allied products is no longer apparent in quotations. We quote for Chicago delivery from mill 1.28c. to 1.33c.

We quote for Chicago delivery of plates from jobbers stock 1.75c.

Sheets.—Local sheet mills report an inquiry during the past week better both in volume and the eagerness of consumers to purchase. The situation is still sufficiently indefinite in its trend to maintain a partial deadlock between the mills and some of their customers on the question of extending deliveries through the last half at current quotations. But the position of the mills appears to be more strongly entrenched each week. We continue to quote for Chicago delivery from mill: No. 10 blue annealed, 1.48c. to 1.53c.; No. 28 black, 1.93c. to 1.98c.; No. 28 galvanized, 2.88c. to 2.93c.

We quote for Chicago delivery from store as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.85c.; No. 28 black, 2.35c. to 2.45c.; No. 28 galvanized, 3.35c. to 3.45c.

Bars.—A prominent maker of bars estimates that the new tonnage involved in implement contracts now being made is scarcely more than 15 per cent. of the normal tonnage contracted for, so large was the proportion of material carried over from old contracts. There remains a substantial proportion still unplaced. Other bar users are responsible for an active inquiry, and there is some disposition to buy bars at present prices to hold for an advance. Among the demands for reinforcing bars is a factory building for the Lennox Furnace Company, Marshalltown, Ia., and a building for the Joseph Pulitzer estate at St. Louis. Bar iron sales are somewhat better. We quote for mill shipments as follows: Bar iron, 1.05c. to 1.10c.; soft steel bars, 1.25c. to 1.33c.; hard steel bars, 1.25c. to 1.30c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—As regards rivets the market continues in the dumps and better prices can be hoped for not so much because of increased sales as of higher prices for bars. Contracting for bolts continues without particular change. We quote from mill as follows: Carriage bolts up to ⅝ x 6 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; machine bolts up to ⅝ x 4 in., rolled thread, 85-10; cut thread, 85-5; larger sizes, 80-10; coach screws, 85-15; hot pressed nuts, square head, $6.60 off per cwt.; hexagon, $7.60 off per cwt. Structural rivets, ½ to ¼ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

We quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ⅝ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, $6, and hexagon, $6.70 off per cwt.

Wire Products.—That the wire trade is in much better condition following a period of contracting is shown by the announcement at the end of last week of an advance in the price of wire to the basis of $1.55 for nails. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, $1.53; wire nails, $1.73; painted barb wire, $1.73; galvanized, $2.13; polished staples, $1.83; galvanized, $2.23, all Chicago.

Cast Iron Pipe.—There is some encouragement to be had in the outlook for cast iron pipe. Lettings that are probable of being closed this week include 6500 tons at Cincinnati, 225 tons at Bingham Canon, Utah; 200 tons at Frankfort, Ohio; 150 tons at Decatur, Ill., and 100 tons at Hibbing, Minn. Routine orders have been very good and shipments are making an excellent showing. We quote as follows, per net ton, Chicago: Water pipe, 4 in., $26; 6 to 12 in., $24; 16 in. and up, $23.50, with $1 extra for gas pipe.

Old Material.—The scrap market appears to be at a standstill. The tonnage of old material which has been coming into the market, though comparatively small, has continuously exceeded the demand, with the result that stocks have accumulated in all the channels through which the scrap is regularly handled. The moving of this accumulation, should the demand improve, will probably delay somewhat the advance in scrap quotations in contrast to any improvement in new material. Railroad offerings listed last week include 1700 tons by the Burlington and 350 tons by the Monon. We quote, for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton

Old iron rails	$12.00 to $12.50
Old steel rails, rerolling	11.50 to 11.75
Old steel rails, less than 3 ft.	10.25 to 10.50
Relaying rails, standard section, subject to inspection	22.00 to 23.00
Old carwheels	11.25 to 11.50
Heavy melting steel scrap	9.75 to 10.00
Frogs, switches and guards, cut apart	9.75 to 10.00
Shoveling steel	9.25 to 9.50
Steel axle turnings	6.75 to 7.25

Per Net Ton

Iron angles and splice bars	$12.00 to $12.25
Iron arch bars and transoms	12.00 to 12.25
Steel angle bars	8.75 to 9.25
Iron car axles	16.25 to 16.75
Steel car axles	11.75 to 12.25
No. 1 railroad wrought	9.00 to 9.25
No. 2 railroad wrought	8.75 to 9.00
Cut forge	8.50 to 8.75
Steel knuckles and couplers	9.00 to 9.50
Steel springs	9.25 to 9.75
Locomotive tires, smooth	9.50 to 9.75
Machine shop turnings	5.00 to 5.50
Cast borings	4.50 to 5.00
No. 1 busheling	7.50
No. 2 busheling	6.00 to 6.25
No. 1 boilers, cut to sheets and rings	6.50 to 7.00
Boiler punchings	9.25 to 9.75
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.50 to 9.00
Grate bars	8.50 to 8.75
Railroad malleable	9.00 to 9.25
Agricultural malleable	8.00 to 8.25
Pipes and flues	6.50 to 6.75

Philadelphia

PHILADELPHIA, July 21, 1914.

Except for the activity in steel bars and sheets, which was noted a week ago and is maintained, there is no apparent deviation from the dullness which has prevailed so long in this district. A few steel rail orders have been received, but they are not large enough when combined to carry operations along for more than a few days. Structural material and plates show no improvement, though in the former a couple of good local propositions are about to go through. Billets continue inactive. Pig iron inquiries have been rather numerous

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but the transactions have been small, for the most part, and sellers who ordinarily figure in current sales find business slipping away from them because of their unwillingness to make concessions. Old material, except in the case of specialties, is not in demand and in most instances the mills are holding deliveries against contracts down to the minimum.

Iron Ore.—Importations of the week ending Saturday were small, consisting of only 6630 tons of Cuban ore. In new business there has been no awakening.

Pig Iron.—Small inquiries have been rather numerous and a good proportion of them have resulted in sales, but despite these, the week is described as a quiet one by the pig iron trade. Business has not been well distributed for the reason that concessions on already low prices have determined the direction in which the orders went. Some pipe iron is said to have been sold at $13.50, delivered. Conflicting stories are afloat as to the price paid by an eastern Pennsylvania steel works for 300 tons of Bessemer iron containing 11 per cent. of silicon. One version has it that foreign hematite was bought at $22.80, delivered, but sellers who put in bids of $23.30 on a basis of $20, furnace, are inclined to discredit this account and believe that a domestic product was bought, with the seller giving an unusual concession. The largest sale was of 3000 tons of Lebanon low-phosphorus to an Eastern consumer at $17.50, furnace. A northern Pennsylvania pipe maker bought 600 tons at a price about equivalent to $14 Philadelphia, the transaction being the largest that one of the more important dealers booked in the course of the week. Virginia iron has been quiet and reports are being received of an accumulation of stock in furnace yards. One seller was cheered by the action of a customer in taking 500 tons of Virginia No. 2 plain against a contract, in view of the fact that the consumer has been ordering in very small quantities for some time. He evidently had concluded that prices had gone as low as they are to go. Southern iron has been quiet also, about the only activity being shipments against contracts. The trade is pointing out that the orders of the Interstate Commerce Commission, reducing the freight rates on Virginia and Alabama iron, will not become effective, according to the rules of the commission, until 30 days after the issuance of the orders. The following prices are for standard brands, delivered to buyers' yards in this district, with most of the transactions at or near the inside price:

Eastern Penna. No. 2 X foundry	$14.75 to $15.00
Eastern Penna. No. 2 plain	14.50 to 14.75
Virginia No. 2 X foundry	15.55 to 15.75
Virginia No. 2 plain	15.30 to 15.55
Gray forge	13.75 to 14.00
Basic	14.00
Standard low phosphorus	20.50 to 21.00

Ferroalloys.—Not only has the lack of new demand continued, but consumers are slow in some cases in taking what they have contracted for. Quotations are without change at $38, seaboard, for English 80 per cent. and $37 for German. Ferrosilicon, 50 per cent., continues at $71 to $73, Pittsburgh, according to quantity.

Bars.—A large manufacturer found the week to be the best one this year, 875 tons having been specified in one day and about 2000 tons in the week, an encouraging feature being that about 90 per cent. of the business was for prompt delivery and direct with consumers. The railroads which have been in the market have closed contracts for about 5000 tons for forward delivery. While prices are still low, ranging from 1.10c. to 1.15c., according to quantity and terms of sale, the outlook is encouraging and this week is expected to bring as much business as last. On the whole orders have been of better size as well as more numerous. Iron bars are quoted at 1.17½c. to 1.20c. Philadelphia.

Structural Material.—The largest and most interesting item in this market was the opening of bids yesterday for two large municipal piers in this city, which will require about 5000 or 6000 tons of material. The Snare & Triest Company were the low bidders at $1,799,000 and in the event of their obtaining the contract, the Pennsylvania Steel Company will supply the steel. Inasmuch as the Snare & Triest Company is the existing contractor on the piers, having done the submarine work, it is extremely likely that it will complete the job. The general contract for the extension to the Hotel Traymore at Atlantic City is understood to have gone to Cramp & Co. There is still a lack of general new demand and eastern Pennsylvania mills are beginning to show a tendency to slacken operations. Quotations are around 1.25c., Philadelphia, on specifications of importance though 1.30c. is asked on small orders.

Plates.—Business is unsatisfactory with the market dragging. Representative makers are operating at a little over 60 per cent. and entirely dependent on small miscellaneous orders. Quotations range from 1.25c. to 1.30c., Philadelphia, with the lower price more freely done.

Billets.—Local makers report no improvement in demand. They continue to quote $21.90, Philadelphia, for open-hearth rolling billets, but the price is almost a nominal one. Forging steel as usual is $4 to $5 per ton higher.

Sheets.—The better demand reported a week ago continues and local mills are running full. Prices are based on 1.50c., Philadelphia, for No. 10 blue annealed sheets.

Coke.—The market has not been much more active than that in pig iron, although some fair sales have been made and some rather attractive inquiries are out. Bids are asked on about 50,000 tons of furnace coke required by gas companies throughout the year, delivery to be made in various parts of the country. A Reading company is reported in the market for between 10,000 and 20,000 tons of furnace coke for last half delivery, some of which may already have been purchased. Another transaction closed calls for one car a day of foundry coke for delivery in the West. Quotations are unchanged at about $2.40 to $2.70 per net ton at oven for foundry coke and $1.75 to $2 for furnace, although with some brands these prices can be shaded. The freight rates to this city from the principal producing districts are as follows: Connellsville, $2.05, Latrobe, $1.85, and Mountain, $1.65.

Old Material.—The week has been inactive, with dealers disinclined to buy at this time and the mills showing no interest. The only life appears to be in specialties, for which there is a fair demand. The only change in prices is in old iron rails which are off $1, making the quotation $14 to $14.50. There are few consumers of these and they are out of the market. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to $1.35 per gross ton, is as follows:

No. 1 heavy melting steel	$10.25 to $10.75
Old steel rails rerolling	12.00 to 12.50
Low phosphorus heavy melting steel scrap	14.00 to 14.50
Old steel axles	14.00 to 14.50
Old iron axles (nominal)	20.00 to 21.00
Old iron rails	14.00 to 14.50
Old carwheels	11.00 to 11.50
No. 1 railroad wrought	12.00 to 12.50
Wrought-iron pipe	9.25 to 9.75
No. 1 forge fire	8.00 to 8.50
Bundled sheets	8.00 to 8.50
No. 2 light iron	5.00 to 5.50
No. 2 busheling	8.00 to 8.50
Wrought turnings	7.75 to 8.25
Cast borings	8.00 to 8.50
No. 1 cast	12.00 to 12.50
Grate bars, railroad	8.00 to 8.50
Stove plate	8.25 to 8.75
Railroad malleable	9.00 to 9.50

Cleveland

CLEVELAND, OHIO, July 21, 1914.

Iron Ore.—The market shows a little more life in that there is some demand for small lots of foundry ore. However, no inquiries are coming out for round lots. Lake shipments show no improvement, being at about the same rate as during June. We quote prices as follows: Old range Bessemer, $3.75; Mesaba Bessemer, $3.50; old range non-Bessemer, $3; Mesaba non-Bessemer, $2.85.

Pig Iron.—The Kokomo Steel & Wire Company has purchased 15,000 tons of basic pig iron for shipment from Detroit during the last half. While the price is

not given out it is understood to have been $12.75 or $12.85 at furnace. Chicago, Columbus and Toledo were even competitors for this business with Detroit, the four cities having the same freight rate. The market in this territory continues quiet. One local interest reports the sale of 1000 tons of malleable and a few lots of foundry iron aggregating 2000 tons. Many consumers have enough iron to last them until September and are not taking any interest in making purchases for later requirements. The merchant stack capacity was further reduced by the blowing out of Perry furnace, Erie, Pa., July 17. Southern iron is fairly firm at $10.25 for No. 2 and it does not appear that any iron can be had at a lower price, except possibly for spot shipment. We note the sale of 500 tons of No. 2 and 500 tons of No. 3 to a sanitary interest at $10.25 and $9.75, respectively, for August and September delivery and 300 tons of No. 4 in Cleveland at $9.50 for the last half. We quote, delivered Cleveland, as follows:

Bessemer	$14.90
Basic	$13.75 to 13.90
Northern No. 2 foundry	13.75
Southern No. 2 foundry	14.60
Gray forge	13.50
Jackson Co. silvery, 8 per cent. silicon	17.55
Standard low phosphorus, Valley furnace	20.25

Coke.—Following the active buying movement of foundry coke the market is again very dull. Foundries are now about all under contract, except some that are buying spot coke from time to time. Good makes of foundry coke are quoted at $2.35 to $2.50 for contract. We quote standard furnace coke at $1.75 to $1.80 for prompt shipment and $1.85 to $2 for contract.

Finished Iron and Steel.—Demand shows considerable improvement both in current orders and specifications on contracts and the feeling in the trade is more optimistic than it has been for some time. While orders are mostly for small lots the actual tonnage that is being booked is considerably larger than it has been for many weeks. There is also an improvement in the business in prospect in the way of tonnage for specific work. Quite a few contracts are being placed for the third quarter and last half. The advance of $1 a ton on steel bars, plates and shapes made by the Carnegie Steel Company has not been followed by all independent mills, but the action of the leading interest has stiffened up the market and other mills are trying to get better prices than have prevailed. However, steel bars, plates and shapes can still be had at 1.10c. There is a fair demand for small lots of structural material for building work and Ohio fabricators are figuring on some bridge work outside of this territory that will require round tonnages. Bids are being received this week for the Brooklyn-Brighton bridge, Cleveland, requiring 1200 tons of reinforcing bars. Additional work in connection with the Superior avenue bridge, Cleveland, will require 800 to 1000 tons of structural material. G. C. Kuhlman Car Company, Cleveland, is in the market for 400 tons of bars, plates and shapes for street cars. Bar iron is quiet with prices unchanged at 1.20c., Cleveland, with lower quotations for outside shipment. The demand for reinforcing bars continues good. Sheets are in moderate demand with prices unchanged at 1.80c. for No. 28 black and 2.80c. for No. 28 galvanized. Warehouse prices are unchanged at 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Many consumers have closed contracts, but some are still holding off, particularly the implement trade, which is trying to make contracts for 12 months. Makers, however, continue to refuse to sell beyond January 1. The advance in bar prices is expected to stiffen up the market somewhat. Rivets are unchanged at 1.50c. for structural and 1.60c. for boiler for carloads. We quote discounts as follows: Common carriage bolts, ⅜ x 6 in., smaller or shorter, rolled thread, 80 and 20 per cent.; cut thread, 80 and 15 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, ⅜ x 4 in., smaller or shorter, rolled thread, 80 and 25 per cent.; cut thread, 80 and 20 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 25 per cent.; square h. p. nuts, blank or tapped, $6.30 off; hexagon h. p. nuts, blank or tapped, $7.20 off; c. p. c. and t. square nuts, blank or tapped, $6 off; hexagon, ⅝ in. and larger, $7.20 off; 9/16 in. and smaller, $7.80 off; semi-finished hexagon nuts, ⅝ in. and larger, 85, 10 and 5 per cent.; 9/16 in. and smaller, 85, 10, 10 and 5 per cent.

Old Material.—A slight improvement is noted. While there is no demand for scrap for July, mills are buying some material for August delivery at the prevailing low prices. Shipments are slow owing to the unwillingness of mills to take material. Prices generally are unchanged. Local mills are offering $10 to $10.25 for heavy melting steel scrap, but dealers are unwilling to sell except in small lots at that price. Iron axles are slightly firmer. We quote f.o.b. Cleveland as follows:

Per Gross Ton

Old steel rails, rerolling	$11.50 to $12.00
Old iron rails	13.00 to 13.50
Steel car axles	15.00 to 15.25
Heavy melting steel	10.00 to 10.50
Old carwheels	11.25 to 11.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.50 to 9.00
Railroad malleable	10.25 to 10.75
Light bundled sheet scrap	7.50 to 8.00

Per Net Ton

Iron car axles	$18.25 to $18.50
Cast borings	5.25 to 5.75
Iron and steel turnings and drillings	5.25 to 5.50
Steel axle turnings	6.75 to 7.25
No. 1 busheling, new	8.25 to 8.50
No. 1 busheling, old	8.00
No. 1 railroad wrought	9.50 to 10.00
No. 1 cast	10.50 to 10.75
Stove plate	7.50 to 8.00

Buffalo

BUFFALO, N. Y., July 21, 1914.

Pig Iron.—The 45,000 tons of pig iron required for the East River tube segment castings, for which the New York Car Wheel Company of this city holds half of the contract, was placed by that company the past week and was practically evenly divided between the Wickwire Steel Company and Rogers, Brown & Co. Aside from this business placed in the week was not large, aggregating between 8000 and 9000 tons, foundry and malleable grades, for the furnaces of the district. While a fairly good volume of inquiry is noted, melters are not inclined to place forward orders beyond their known requirements. The minimum selling price of $13 at furnace for any grade of pig iron, as reported last week, is still maintained. The lower prices at which some large tonnages were reported as booked by Buffalo furnaces three weeks ago have disappeared. In fact local producers do not admit that orders were booked at that time to the extent rumored or at prices under the general schedule. We quote as follows, f.o.b. furnace, for current quarter and last half delivery:

No. 1 foundry	$13.00 to $13.50
No. 2 X foundry	13.00 to 13.25
No. 2 plain	13.00
No. 3 foundry	13.00
Gray forge	13.00
Malleable	13.00 to 13.25
Basic	13.25 to 13.50
Charcoal, regular brands and analysis	15.75 to 16.75
Charcoal, special brands and analysis	20.50

Finished Iron and Steel.—The past week has shown considerable improvement in buying, particularly in nails and wire products, on which the price has now been advanced $1 per ton, being 1.35c. for ordinary wire and 1.55c. for nails, in carload lots. The 1.10c. price on all hot finished products, bars, small shapes, structural material and plates has been withdrawn by practically all agencies and producers of the district, and 1.15c. is now bottom for current quarter delivery. A fairly good total of actual orders was placed during the week to supply immediate needs and some forward requirements, many users feeling that they would gain nothing by further waiting and might lose. No change is reported in price of cold rolled steel or sheets. The contract for construction of the Ralston Purina Company's elevator and cereal mills at the Nickel Plate Railroad and Elk street, this city, has been placed with the Turner Construction Company, which has in turn given the contract for the 400 tons of reinforcing bars required to the Corrugated Bar Company, Buffalo. Lathrop, Shea & Henwood, of this city and Scranton, were low bidders on the general contract for Section 118, New York State Barge Canal, taking about 900 tons of structural steel, and Larkin & Sangster,

Seneca Falls, N. Y., were low bidders on the New York State Barge Canal, contract 109, requiring about 1300 tons of structural material.

Old Material.—A noticeable improvement in feeling is observed, with a considerably stronger undercurrent of demand developing in heavy melting steel, turnings and borings and No. 1 busheling scrap. The price of machine shop turnings has advanced 25c. per ton. While there is no large movement in any line a greater number of inquiries forecasts an awakening in demand in the near future. We quote dealers' selling prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$10.25 to $10.50
Low phosphorus steel	14.00 to 14.50
Boiler plate sheared	11.50 to 12.00
No. 1 railroad wrought scrap	10.00 to 10.50
No. 1 railroad and machinery cast	10.50 to 11.00
Old steel axles	12.50 to 13.00
Old iron axles	19.50 to 20.00
Old carwheels	10.00 to 10.50
Railroad malleable	9.25 to 9.75
Machine shop turnings	5.50 to 6.00
Heavy axle turnings	7.50 to 8.25
Clean cast borings	6.00 to 6.50
Old iron rails	13.00 to 13.75
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	9.00 to 9.75
Wrought pipe	7.50 to 8.00
Bundled sheet scrap	6.25 to 6.50
No. 1 busheling scrap	8.25 to 8.75
No. 2 busheling scrap	5.75 to 6.25
Bundled tin scrap	10.50

Cincinnati

CINCINNATI, OHIO, July 22, 1914.—*(By Wire)*

Pig Iron.—The purchase of approximately 18,000 tons of basic iron by a Kokomo manufacturer has been confirmed. This order was booked by a Lake furnace interest, and it is reported that the sale price was under $13 at furnace for this year's shipment. However, it is generally understood that part of the lot will be allowed to lap over into the first part of next year, although this rumor is not confirmed. Foundry iron is a trifle more active, but sales in this territory are mostly in small lots. A central Indiana firm bought 600 tons of Southern foundry and 500 tons of Northern for last half delivery. About 500 tons of Southern iron was booked by a central Ohio melter, and there is an inquiry for a like amount from the same territory. Production in the Hanging Rock district is lower than it has been for years. Only two stacks are in operation producing foundry iron, and one of these is expected to blow out just as soon as a small quantity of ore on hand is worked up. No arrangements have been made by the majority of furnaces in the Ironton district for a future supply of ore, which would indicate that unless they act promptly they will be idle during the coming winter. The postponement of the date on which the reduction of Southern iron rates goes into effect until October 1 does not excite much comment here. This action will doubtless aid the sellers to insist on purchasers taking their shipments as contracted for. A few small sales of Lake Superior charcoal iron have been made at regular quotations. Malleable iron continues inactive. Based on freight rates of $3.25 from Birmingham and $1.20 from Ironton we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft	$13.75 to $14.25
Southern coke, No. 2 f'dry and 2 soft	13.25 to 13.75
Southern coke, No. 3 foundry	12.75 to 13.25
Southern No. 4 foundry	12.25 to 12.75
Southern gray forge	11.75 to 12.25
Ohio silvery, 8 per cent. silicon	17.20 to 17.70
Southern Ohio coke, No. 1	15.45 to 15.95
Southern Ohio coke, No. 2	14.45 to 14.95
Southern Ohio coke, No. 3	14.20 to 14.45
Southern Ohio malleable Bessemer	14.45 to 14.95
Basic, Northern	14.45 to 14.95
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	27.25 to 27.75

(By Mail)

Coke.—There is very little to say regarding either furnace or foundry coke. There is no contracting for either of the grades, and the few small sales of foundry coke being made are for nearby shipment. Curtailment in production has about reached the limit, although it is rumored that further reductions in the Connellsville field are contemplated. The consumption of foundry coke is exceedingly light in this district, and there does not appear to be any early chance for betterment. Prices remain stationary around $1.70 to $1.90 per net ton at oven for Connellsville furnace coke, with foundry grades quoted all the way from $2.25 to $2.60. The quotations named on foundry coke are about the same in all three fields, but a premium of 10c. to 20c. a ton is asked for Wise County and Pocahontas 72-hr. brands.

Finished Material.—Hardware jobbers are buying wire nails, machine and carriage bolts, rivets, etc., more freely than for some time past. It is the general opinion with this class of the trade that prices have reached bottom, and these buyers are trying to cover for future requirements. No long time contracts are being taken by the mills, and as a consequence all of the material bought now has to be taken care of promptly. Sheets are making a better showing, and inquiries are increasing. The mills have also assumed a firmer attitude on prices and are holding No. 28 black sheets at 1.80c. Pittsburgh and galvanized at from 2.75c. to 2.80c., making the prices f.o.b. Cincinnati and Newport, Ky., 1.95c. for black sheets and from 2.90c. to 2.95c. for galvanized sheets. There is very little doing in either steel bars or structural shapes, and store prices on both are around 1.75c. to 1.80c. a lb. The American Rolling Mill Company, Middletown, Ohio, has had both of its plants in operation for over a week, and on July 20 started up its plant at Zanesville, Ohio. The Newport Rolling Mill Company, Newport, Ky., that has been shut down for repairs three weeks, expects to commence operations August 1.

Old Material.—The market continues very sluggish, with no fixed prices on any particular kind of scrap material. An embargo still exists against a nearby rolling mill, but this will probably be raised within a few days. The foundries are buying rather stingily, and are not disposed to make any future contracts. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum prices are dealers' quotations f.o.b. at yards:

Per Gross Ton

Bundled sheet scrap	$6.75 to $7.25
Old iron rails	11.75 to 12.25
Relaying rails, 50 lb. and up	19.75 to 20.25
Rerolling steel rails	10.75 to 11.25
Melting steel rails	9.25 to 9.75
Old carwheels	10.25 to 10.75

Per Net Ton

No. 1 railroad wrought	$8.75 to $9.25
Cast borings	4.50 to 5.00
Steel turnings	4.50 to 5.25
Railroad cast scrap	9.25 to 9.75
No. 1 machinery cast scrap	10.25 to 11.25
Burnt scrap	6.00 to 6.75
Old iron axles	15.50 to 16.00
Locomotive tires (smooth inside)	9.75 to 10.25
Pipes and flues	6.25 to 6.75
Malleable and steel scrap	7.25 to 7.75
Railroad tank and steel scrap	5.25 to 5.75

Birmingham

BIRMINGHAM, ALA., July 20, 1914.

Pig Iron.—Sizeable tonnages of pig iron were sold recently at $10 per ton, including one lot of 5000 tons. One maker is reported as having taken off the lid and gone to $10 per ton until considerable was disposed of both from stocks on hand and for future make. On the other hand, transactions are reported on a $10.25 basis for the last half of the year, with carload lots selling at $10.50. One manufacturer claims to have sold 60,000 tons since the buying movement began, including one lot of 3000 tons in Louisville, 2000 tons in Philadelphia as well as a respectable amount in Cincinnati and Chicago territory on the $10.25 basis. One maker sold 3600 tons in the week and another 7000 tons. It is probable that the total business will approximate 20,000 tons or more. Consumers in some instances have requested delay in shipments until the new rate goes into effect, but as that has now been postponed until October 1, some of these requests will probably be withdrawn. The Gulf States Steel Company has resumed furnace operations, but will make basic for its own use alone. It resumed also at its iron mines, quarry, etc. We quote per gross ton f.o.b. Birmingham district furnaces as follows:

No. 1 foundry and soft	$10.50 to $11.00
No. 2 foundry and soft	10.00 to 10.50
No. 3 foundry	9.50 to 10.00
No. 4 foundry	9.25 to 9.75
Gray forge	9.00 to 9.50
Basic	10.00 to 10.25
Charcoal	23.50 to 24.00

Cast-Iron Pipe.—Some impetus was given the trade this week when the National Cast Iron Pipe Company put on its second pit. This plant is a new one and has just entered the market. Prices are reported as difficult to maintain. Orders have been coming in in small lots, but the aggregate for the week is reported as fair. We quote per net ton, f.o.b. pipe shop yards as follows: 4-in., $20.50; 6-in. and upward, $18.50. These prices have been shaded in instances.

Coal and Coke.—Both coal and coke are making a better showing, although prices for the former have not risen. Mines are becoming busier. Domestic coal is in brisker demand and mines are operating on a 4-day turn. Coke is selling stronger, a quantity of by-product having been taken off the market for furnace use. There has been active trading with Western points. We quote per net ton f.o.b. ovens as follows: Furnace coke, $2.75 to $2.90; foundry, $3.25 to $3.50.

Old Material.—The scrap yards are groaning with contents and the outward movement is slow, although one dealer succeeded in disposing of 3000 tons in the past week. Prices are said to be firmer. We quote per gross ton f.o.b. dealers' yards as follows:

Old iron axles	$14.50 to $15.00
Old steel axles	14.50 to 15.00
Old iron rails	13.00 to 13.50
No. 1 railroad wrought	10.00 to 11.00
No. 2 railroad wrought	8.50 to 9.00
No. 1 country wrought	9.00 to 10.00
No. 2 country wrought	8.00 to 9.00
No. 1 machinery cast	9.50 to 10.00
No. 1 steel scrap	8.00 to 8.50
Tram carwheels	9.50 to 10.00
Standard carwheels	10.50 to 11.00
Stove plate	8.00 to 8.50

St. Louis

ST. LOUIS, MO., July 20, 1914.

A better tone prevails generally and reports from all representatives and dealers are that improvement in business is assured. Definite transactions show it now and they are expected to be better, particularly after August 1.

Pig Iron.—Furnace representatives report firmer prices this week and in some instances the quotation for No. 2 Southern, Birmingham basis, has been raised to $10.50 from $10.25, the intimation being that the furnaces referred to do not intend to permit the consumers to get all the benefit from the recently ordered reduction in freight rates. Furnaces, also, are advising customers who are asking delay in shipments, presumably to take advantage of the reduced rates, that the conditions under which such delay will be permitted will be payment as of contracted delivery with the iron allowed to lie in the furnace yards until the rates take effect. Transactions of the week were altogether of the small lot order, but there was a considerable number of them, showing that the material is needed and that hand to mouth buying is still the rule. An inquiry, unfilled at this writing, is for 1000 tons practically equally divided between Nos. 1 and 2 foundry and Northern and Southern iron. There is also an unfilled inquiry for 100 tons of No. 2 Northern. Probably the largest sale of the week was 150 tons of No. 2 Southern. Prices, aside from the change noted, remain the same as at last report.

Coke.—One sale of 8000 tons of by-product coke constitutes about all the coke business of this market for the week, though there were some transactions in small lots for immediate delivery. Best 72-hr. selected Connellsville foundry coke is quoted at oven at $2.25 for immediate delivery and $2.35 for forward contracts. By-product coke is $5.10 to $5.20, St. Louis delivery.

Finished Iron and Steel.—The chief interest has announced an advance in prices from 1.10c. to 1.15c. and states that the increase in business in July to date has been larger proportionately than in the same part of June. The aggregate of new business is fully 75 per cent. of normal with indications that it will be greater shortly. The only large contracts in immediate sight are for the East Kansas avenue bridge at Kansas City, Mo., requiring about 3000 tons of structural, 200 tons of rails and 220 tons of reinforcing bars. The Dallas and Kansas City Terminals continue to interest the market, which is awaiting announcements of contracts. All other branches of the finished steel market are improving, but none shows any strongly individual feature.

Old Material.—Dealers are becoming optimistic and prices are being held more firmly. The announcement that many of the industries on the east side of the river will become active by August 1 and the settlement of the scale with the Amalgamated Association have had a heartening effect among the scrap men who now predict activity within a very short time. The lists out this week include 1800 tons from the Missouri, Kansas & Texas, 200 tons from the Clover Leaf and 1500 tons from the Chicago, Burlington & Quincy. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton	
Old iron rails	$11.00 to $11.25
Old steel rails rerolling	11.25 to 11.50
Old steel rails, less than 3 ft.	10.50 to 10.75
Relaying rails, standard section, subject to inspection	21.00 to 23.00
Old carwheels	11.00 to 11.25
No. 1 railroad heavy melting steel scrap	10.50 to 10.75
Shoveling steel	8.00 to 8.50
Frogs, switches and guards cut apart	10.50 to 10.75
Bundled sheet scrap	5.00 to 5.25
Per Net Ton	
Iron angle bars	$10.00 to $10.50
Steel angle bars	9.25 to 9.50
Iron car axles	16.75 to 17.25
Steel car axles	11.75 to 12.25
Wrought arch bars and transoms	11.00 to 11.50
No. 1 railroad wrought	8.00 to 8.25
No. 2 railroad wrought	8.00 to 8.25
Railroad springs	9.25 to 9.50
Steel couplers and knuckles	9.25 to 9.50
Locomotive tires, 42 in. and over, smooth	8.75 to 9.25
No. 1 dealers' forge	7.75 to 8.00
Mixed borings	4.00 to 4.25
No. 1 busheling	7.25 to 7.50
No. 1 boilers, cut to sheets and rings	5.75 to 6.25
No. 1 cast scrap	9.50 to 10.00
Stove plate and light cast scrap	8.25 to 8.75
Railroad malleable	8.00 to 8.25
Agricultural malleable	7.50 to 8.00
Pipes and flues	5.75 to 6.25
Railroad sheet and tank scrap	5.75 to 6.00
Railroad grate bars	7.25 to 7.50
Machine shop turnings	5.00 to 5.25

New York

NEW YORK, July 22, 1914.

Pig Iron.—The amount of iron booked by Buffalo district furnaces for shipment in the third and fourth quarters has created a better feeling among sellers. The placing of this tonnage on furnace order books is an indication that melters of pig iron see better business ahead and this has been reassuring in spite of the fact that very low prices—$12.50 and less, at furnace—were reached in some of the late sales. Another factor to which attention is called is that in a number of instances requests have come for larger shipments to foundries, showing how closely consumers have run on pig iron stocks. A Massachusetts manufacturer of machinery has closed for 3000 tons of high-phosphorus iron, and from a manufacturer of electrical machinery new inquiries have come in the past week amounting to several thousand tons, including some high silicon iron. A New Jersey foundry has come into the market for 1000 tons for delivery in August, September and October, equally divided between No. 2 plain and iron running 3.25 to 3.50 per cent. in silicon. Pipe foundries in the East have bought several more lots in the past week, some high sulphur grades going at about $13.50, delivered at Delaware River plant. Eastern Pennsylvania furnaces have been in close competition on recent contracts, $13.60 to $13.65 being done in some cases, equivalent to $14.30 to $14.35 tidewater. Virginia iron has figured in some Eastern transactions, and while $12.75 at furnace has been asked for No. 2 X for delivery in the remainder of the year, there have been concessions; on some re-sale iron $12.50 at furnace is reported. Eastern pig iron producers at a meeting in Philadelphia, Friday, found rather more encourage-

ment from the amount of pig iron lately sold than from the prices it brought. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, $14.75 to $15; No. 2 X, $14.35 to $14.60; No. 2 plain, $14.20 to $14.45. Southern iron is quoted at $14.75 to $15 for No. 1 and $14.25 to $14.50 for No. 2.

Ferroalloys.—A sale of 200 tons of 80 per cent. ferromanganese was made in the past week which is the first one involving more than a carload lot in some time. Sales of small lots are being made as well as inquiries. Reports that the 300 tons, stated as being before the market about three weeks ago, had been sold could not be confirmed. Indications are in evidence that considerable of the tonnage that is moving is going to the German producers, their quotation being $37, seaboard, while the English product is still $38, seaboard. It is stated that European producers of 50 per cent. ferrosilicon are quoting under the prices ruling in this country, but quotations here still remain at $71 to $73 Pittsburgh, according to the quantity desired.

Finished Iron and Steel.—The announcement that the Carnegie Steel Company has placed bars, plates and shapes at 1.15c., Pittsburgh, as a minimum, has met a mixed reception, with a preponderance of belief that it will have a stiffening influence. This view arises from the conclusion that matters of price are of decidedly secondary importance and that instead the relatively low level of buying is the result of the general uncertainty of the immediate future. The minority places emphasis on the fact that so far as is known, the steel companies have not heavy bookings and that under the conditions a price $1 above the ruling market will be hard to sustain. Other large companies, however, report their prices now on the basis of 1.15c., Pittsburgh, but there is the possible exception that anything of an attractive nature from a mill standpoint for immediate shipment will average 1.10c., Pittsburgh. Generally the market is colorless as regards new inquiry, and business being booked is not appreciably heavier than it has been in the last week or two. In the structural field the largest business placed includes 1800 tons for the Metropolitan Museum of Art, New York, to the Hedden Steel Construction Company, which has also 300 tons for the Montclair high school. It is generally believed that the Hay Foundry & Iron Works has the 7000 tons required for the Newark terminal of the Public Service Corporation. The Brooklyn Structural Corporation has taken 250 tons for a school building for the Trinity Corporation at 176th street and Washington avenue. The largest new project in the east on which bids have lately gone in are municipal piers, Philadelphia, 5500 tons. In railroad cars it appears that the Toledo & Ohio Central obtained such attractive prices for the gondolas that it increased its intended purchases to 2500, one-half going to the Ralston Steel Car Company and the remainder to the Haskell & Barker Car Company. The Chicago, Indianapolis & Louisville increased its order with the Haskell & Barker Car Company by 250 additional box cars. It will be some time next week before any purchases are likely to take place on the 4600 cars for the Southern Pacific. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York. We quote iron bars at 1.20c. to 1.25c., New York. For lots from store we quote iron and steel bars at 1.80c. to 1.85c., New York, and plates and structural material at 1.85c. to 1.90c.

Cast Iron Pipe.—The largest public letting to come up in the week is one for 1350 tons of 6, 8, 10 and 12-in. pipe for Duxbury, Mass., bids to be taken July 23. Small inquiries continue and prices have been maintained. We quote carload lots of 6 in. at $20.50 to $21 per net ton, tidewater.

Old Material.—Steel works, iron rolling mills and foundries continue to be exceedingly poor buyers. Steel makers in eastern Pennsylvania are still willing to take on heavy melting scrap at $10 delivered, but sellers are little disposed to do business at this figure. Dealers find little encouragement under present conditions to take on scrap offered by railroads and others. While a better market is looked for in the fall the intervening weeks seem to hold little promise. Steel companies in all districts have the same attitude, that of unwillingness to ship in material even in quantities which ordinarily would be negligible and about which no point would be raised. The following are dealers' quotations, per gross ton, New York. Most of them would be shaded on the appearance of real business:

Old girder and T rails for melting	$7.75 to	$8.25
Heavy melting steel scrap	7.75 to	8.25
Relaying rails	20.50 to	21.00
Rerolling rails (nominal)	10.00 to	10.50
Iron car axles	17.00 to	17.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	10.00 to	10.50
Wrought iron track scrap	8.75 to	9.25
No. 1 yard wrought, long	8.25 to	8.75
No. 1 yard wrought, short	7.75 to	8.25
Light iron (nominal)	3.25 to	3.50
Cast borings	5.50 to	5.75
Wrought turnings	5.25 to	5.50
Wrought pipe	7.00 to	7.50
Carwheels	9.25 to	9.75
No. 1 heavy cast broken up	10.00 to	10.50
Stove plate	7.50 to	8.00
Locomotive grate bars	6.00 to	6.25
Malleable cast	7.25 to	7.75

Boston

BOSTON, MASS., July 21, 1914.

Old Material.—The trade is quite cheerful. A slight actual improvement is noted in transactions in steel, and dealers state that they have received encouraging reports from some of the mills. The demand for cast iron scrap remains exceedingly dull. The general feeling is that the improvement will be constant from now on, though naturally August should retard things as usual. Prices have not changed. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. In comparison with Philadelphia prices the differential for freight of $2.30 a ton is included. Mill prices are approximately 50c. a ton more than dealers' prices:

Heavy melting steel	$8.25 to	$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	13.25 to	13.75
Old iron axles	21.25 to	21.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	9.00 to	9.25
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.50 to	7.75
Cotton ties (bundled)	6.00 to	6.25
No. 2 light	3.75 to	4.25
Wrought turnings	5.00 to	5.50
Cast borings	5.25 to	5.75
Machinery, cast	11.25 to	11.50
Malleable	8.00 to	8.25
Stove plate	7.75 to	8.00
Grate bars	5.25 to	5.50
Cast-iron carwheels	11.00 to	11.25

British Sentiment Overcast

Producers Very Short of Work—Foreign Competition Keen with Prices Lower

(By Cable)

LONDON, ENGLAND, July 22, 1914.

The market is overcast by home and foreign politics. Pig iron is unchanged. Rubio ore is selling at 16s. 6d. ($4.01) c.i.f. Tees furnaces. Belgian basic bars are reported to have been sold down to 78s. ($18.98) f.o.b. Antwerp, and even less. It is stated that producers are very short of work and that German sellers would probably go below 80s. ($19.47) for desirable specifications. French 2-in. billets have sold at 70s. ($17.03) f.o.b. The Tata Iron & Steel Company booked 19,000 tons of rails for India. It is improbable that the plans for extending the German Steel Works Union can mature before late autumn. The stocks of pig iron in Connal's stores are 82,893 gross tons, against 80,373 tons a week ago. We quote as follows:

Tin plates, coke, 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 12s. 1½d. ($2.95), as against 11s. 10½d. ($2.89), a week ago.

The following prices are per ton of 2240 lb.:

Cleveland pig-iron warrants (Tuesday), 51s. 3d. ($12.47), same as a week ago.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 51s. 6d. ($12.53), as against 51s. 9d. ($12.59) a week ago.

Hematite pig iron, f.o.b. Tees, 59s. ($14.35)

Sheet bars (Welsh), delivered at works in Swansea Valley, £4 10s. ($21.89).

Steel bars, export, f.o.b. Clyde, £5 15s. ($27.98).

Steel joists, 15-in., export, f.o.b. Hull or Grimsby, £5 10s. ($26.76).

Steel ship plates, Scotch, delivered local yards, £5 12s. 6d. ($27.37).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 7s. 6d. ($40.75).

Steel rails, export, f.o.b. works port, £5 12s. 6d. ($27.37).

The following prices are per export ton of 1015 kilos, equivalent to 2237.669 lb.

German sheet bars, f.o.b. Antwerp, nominal.

German 2-in. billets, f.o.b. Antwerp, nominal.

German basic steel bars, f.o.b. Antwerp, 80s. ($19.47), for both prompt and forward.

German joists, f.o.b. Antwerp, £5 2s. to £5 5s. ($24.82 to $25.55).

Freight rates from Antwerp to New York, Boston, Philadelphia and Baltimore, per 1000 kilos (2204 lb.), are about as follows: Billets, blooms and bars, up to 20 ft. 9s. to 10s. ($2.19 to $2.43). Iron and steel sheets, 11s. to 12s. 6d. ($2.68 to $3.04). Beams up to 30 ft., 12s. 6d. ($3.04).

(By Mail)

Reduction in Blast Furnace Wages—Coke Firm, but Finished Steel Much Weaker

LONDON, July 10, 1914.

According to official investigation the average selling price of No. 3 Cleveland pig iron for the second quarter of the year was 51s. 0.70d. ($12.42) a ton, as compared with 51s. 5.13d. ($12.52) a ton in the first three months, and in accordance with the sliding scale arrangement there will be a reduction in blast furnace workers' wages of 0.5 per cent., which will bring them from 24.25 per cent. to 23.75 per cent. above the standard. The relief does not amount to much so far as the wages bills are concerned, but it is heralded as the prelude to a further reduction later in the year, and as such is regarded as being very welcome. All essential conditions in the pig-iron trade of the Cleveland area are unaltered, the outstanding points being the excessive stringency of the market caused by the reduction in the make and the high fuel costs. An abatement of the high prices asked for coke is awaited with tense anxiety, but meanwhile there is no budging on the part of the owners of ovens, and the outlook is for absolutely no alteration.

New buying of pig iron is of very small account, but now that the Russian affair is settled and iron can be imported into Russia free of duty, an important revival of buying for this account is expected. Within the last few days merchants report that they are finding a little more doing for this part of the Continent, but there can be no doubt that the main share of what business is to be done will fall to Germany, where all are excessively hard up for orders to keep plants running. The tendency is now to look for a good time in the autumn. Certainly the harvest prospects in the United States are brilliant, if all the accounts cabled to this side are to be believed, and this is a point which undoubtedly should make itself felt later on, but at present it has little effect. People are, however, looking for bull features and some of them have seized on this as likely to prove the turning point. It is much to be desired that this may be so, for things are really very poor all over Europe and some fresh move is needed now to set the wheels of industry turning a little more rapidly than has been the case of late. The stocks in the public stores continue to fall and are literally at the danger point, but there is no speculative interest in the market which is being slowly throttled so far as warrants are concerned. Hematite has had a poor market and some low prices have been accepted for East Coast material, though at the reduction in force, about 59s. ($14.36) f.o.b. for mixed numbers, the tone is steady enough.

In semi-finished steel expectation runs high that Welsh bars may be reduced. They have stood at 90s. ($21.90) or 91s. 3d. ($22.20), delivered locally, as officially named for months, but matters seem to be getting strained to the breaking point now. Works in Monmouthshire, which are not comprised in the Welsh Steel Makers' Association, have been selling sheet bars at very low figures, and this, it is felt, may precipitate a fall in the official rates. Monmouthshire bars have been sold delivered in the Midlands at 88s. 9d. ($21.60), so that it is pretty clear that they could be bought for at least 2s. 6d. (0.61c.) less, delivered next door to makers' works. Foreign material is weak too and sheet bars can be bought from French works at 74s. ($18) f.o.b., which is equal to about 78s. 6d. ($19.10) c.i.f., Newport. There is nothing doing, however, buyers being resolved not to purchase ahead of needs, and both the tin plate and galvanized sheet trades are in a poor way.

FINISHED STEEL AT LOWEST PRICES OF THE YEAR

Finished steel is still affected by the low offers of Continental material. The spurt in prices which followed the announcement that efforts were to be made to broaden and prolong the existence of the German Steel Works Union has given place to a fresh period of depression, and prices now stand at the lowest points seen this year. Merchants have been able to buy forward shipment basic bars at below 80s. ($19.47) f.o.b., and still lower figures are gossiped about as having been done. It is clear that the position is bad. Plates and sheets are weaker too and all works want orders and specifications.

At the Birmingham quarterly meeting held yesterday the tone was pretty poor and the attendance was very limited. Prices, however, remained unaltered. Best bars were unchanged at £8 10s. ($41.36) a ton, but it is regarded as doubtful if this figure can be maintained, seeing that common iron is to be had at £2 ($9.73) less. Demand is limited all round, and the Midland pig-iron makers continue to cut down their output which nevertheless is still in excess of requirements.

German Market Unfavorable

Depression in All Branches Still General and Prices Unimproved

BERLIN, July 10, 1914.

The iron and steel market continues to be extremely unfavorable. The single cheerful note comes from the comparatively unimportant tin plate industry, which reports good and steadily increasing business. The production of tin plates in Germany has gained until now for the first time the domestic consumption is fully supplied by the home industry and the English imports, which formerly reached 48,000 tons per year, have ceased entirely. Capacity orders are on hand for July and August, and the outlook is excellent.

A PROVISIONAL SYNDICATE IN TUBES

The price battle in the tubing market has been temporarily ended by the formation of the provisional tube syndicate, expiring, unless made permanent, on August 15. With the formation of this provisional syndicate prices were raised 15 marks ($3.57) per ton upon specifications for immediate execution, but the improvement of the business that was expected from this measure has not been realized. The dealers, by excessive rebates and other concessions, appear to have supplied all demands for some time to come, and no contracts of any importance have been reported at the new price. There is considerable doubt, notwithstanding the earnestness with which efforts to form a permanent tube syndicate are being made, whether the syndicate will ever come into actual being. These doubts are strengthened by the preliminary agreements to give up the plan in case the proposed syndicate for other B products should fail.

Further light on the depression of the past year, if any more were needed, is thrown by the report of the Steel Works Union for the year ending June 30. It shows a total production of 6,114,150 metric tons, com-

pared with 6,520,300 tons in the preceding 12 months, a decrease of 406,150 tons. That this decrease would have been much greater but for the support accorded by the state railroad authorities is apparent from the fact that, whereas all other products of the association show a loss from the figures of the previous fiscal year, there was an increase of 135,500 tons in railroad material. Compared with the year 1911-1912, the increase was 569,000 tons. This shows the part played by the railroad administration in helping the iron industry through the depressed period. The decrease in structural steel was 356,000 tons, more than 20 per cent. of the shipments of the preceding year, the result of the depression in the building world. The shipments of the Pig-Iron Association for June were the lowest since the association was organized, reaching but 70.3 per cent. of the quota, against 78.94 per cent. in May and 91.87 per cent. in June, 1913. One reason for this is, of course, the disinclination of the dealers, in the midst of their inventories, to carry big stocks over into the next year. Another explanation is the strong falling off of exports, especially to Belgium.

SYNDICATE IN B PRODUCTS UNLIKELY

The unsatisfactory conditions in the Upper Silesian iron market continue. The negotiations for the syndicalization of the B products, which have continued for two months, have brought no improvement of business. Further negotiations are to be had soon, but it is generally felt that the attempt will be a failure if the syndicate be not effected at the latest by August 1. The chief concern of producers and handlers alike is to find consumers, and great concessions are being made in the way of special terms of delivery, extended credit and other means. Exports to the Balkans are extremely moderate. Russia is still willing to take considerable, but the competition is so sharp that profits are infinitesimal. The Steel Works Union will maintain prices of the last quarter for the coming three months for semi-finished and structural steel (A products), but since these have been maintained for some time, while prices for the B products have fallen, the relations between these two classes have become quite disproportionate. Semi-finished material, for instance, is about as dear as bars and similar products.

Business continues bad in heavy and light plates. Both the prices and the turnover are unsatisfactory. The consumers, especially in light plates, complain bitterly of inability to market their products and have difficulty in meeting their obligations. The only consolation is in a somewhat increased export to Switzerland and Italy. The mooted formation of a plate syndicate, it is generally felt, must include all kinds of plates, wrought as well as basic, and also tinned. Negotiations for the formation of a light-plate syndicate, which were to be resumed on July 15, have been adjourned to July 25, as the question of quotas is taking more time than was expected.

A WIRE SYNDICATE DOUBTFUL

The situation in the wire market shows no change, being still most unsatisfactory. The turnover in rolled wire is, it is true, tolerably fair, but it is maintained only by heavy exports at unsatisfactory prices. The export price has dropped to 100 marks ($23.80) f.o.b. at Antwerp. An overproduction in the finer manufactures is making itself severely felt. The result is a dropping of prices until the finished material is as cheap as the crude. Wire nails, for example, have gone down to 11¾ marks ($2.80) and even less. There are strong doubts as to the likelihood of the proposed wire syndicate being organized, and this quite apart from the fact that it is proposed to make its organization dependent upon the formation of the proposed syndicate for B products. The wire cable business continues bad, both in respect of sales and prices. Conditions in the export business are especially complained of. It is declared that competition in the foreign field is being carried on in heretofore unheard-of forms. The unfavorable condition of the iron and steel market is also affecting the ore market. Thus far orders have decreased but slightly, but there is a general disinclination to contract far ahead or for large quantities of ore. The report to the annual meeting of the directors of the Torgau Steel Works shows a loss of 190,000 marks for the year just ended. Structural cast steel, produced by the Dellwik-Fleischer process, forms the company's chief product.

SEVERE COMPETITION IN BELGIUM

Conditions in the Belgium market have degenerated into a mad devil-take-the-hindmost scramble for what business is to be had. Some producers there are cutting export prices ruthlessly. In the pig-iron market, however, prices are unchanged. Puddling iron rules from 60½ to 61 francs ($11.68 to $11.77); Thomas iron, 61 to 65 francs ($11.77 to $12.55); foundry iron, 65 to 66 francs ($12.55 to $12.74). Business in semi-finished products is suffering severely under German and French competition. Rolled blooms are lifeless at 68s. to 70s. ($16.55 to $17.03) f.o.b. Antwerp. Rails are slightly improved and beams are about normal. Uniform prices for plates do not exist. Some quotations are: 3/16-in. plate, 93s. to 94s. ($22.63 to $22.87); ⅛-in., 95s. to 96s. ($23.12 to $23.36); 3/32-in., 97s. to 98s. ($23.60 to $23.85). Domestic prices for these products run from 122½ to 127½ francs ($23.64 to $24.61). The bar market is lifeless, and not only are orders not sufficient to keep idle hands busy, but foreign competition is growing sharper. Export prices for basic iron are 80s. to 82s. ($19.47 to $19.96); for wrought iron, 86s. to 87s. ($20.93 to $21.17), with domestic prices respectively 110 to 112½ francs ($21.33 to $21.71) and 120 to 122½ francs ($23.16 to $23.64).

Metal Market

NEW YORK, July 22, 1914.

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Spelter	
July	Lake	Electrolytic	Tin, New York	New York	St. Louis	New York	St. Louis
15	13.75	13.50	31.55	3.90	3.75	5.00	4.85
16	13.75	13.50	31.70	3.90	3.75	5.00	4.85
17	13.75	13.50	31.85	3.90	3.75	5.00	4.85
18	13.75	13.50	32.00	3.90	3.75	5.00	4.85
20	13.75	13.50	32.12½	3.90	3.75	5.00	4.85
21	13.75	13.50	31.60	3.90	3.75	5.00	4.85

Copper has been inactive and is lower. Tin is a little higher after a lively week. Lead has been quiet and is a trifle easier. Spelter and antimony have been dull and their prices are unchanged.

New York

Copper.—The market has been for some days in a state bordering on stagnation, with no more demand from abroad than there has been from domestic consumers. The latter seem to be determined not to buy until they are forced to. As a result of the conditions, first hands are ready to sell electrolytic at 13.62½c., 30 days, delivered, or 13.50c., cash, New York, and it is extremely probable that an offer of a few points lower might be accepted. A small lot of electrolytic was sold July 21, at 13.60c., cash, New York, for prompt delivery. All agencies are eager to sell but, as already intimated, consumers are making sellers carry the stock. All the indications are that business has not improved much with the brass mills. In the week there have been a few inquiries for Lake and the business went at less than 13.75c., although that is the price at which prime Lake is held. Other grades are to be had cheaper. The quotations in London to-day are £60 5s. for spot and £60 15s. for futures. Exports this month total 21,521 tons.

Tin.—This metal has shown more life than all of the others. The market has been unsettled, erratic and sensitive to the slightest influence, but despite all this, good businss was done on two or three days. July 15, probably 250 tons was dealt in, some of the buying being of a speculative character and some of it on the part of dealers. It was believed that London would go up on the following day and when it did not there was first disappointment and then a listless mar-

ket. On July 17, the foreign market became firm, and this condition, together with the fact that the steamship sailing for New York from London the next day, had no tin aboard, caused a better feeling here and fair sales were made, probably 200 tons changing hands. On Saturday there was a little business at 32c., but on Monday the market became very dull again. Again, yesterday, there was fair activity with sales involving about 150 tons and more could have been done had not dealers advanced their asking price. The early cables from London to-day do not indicate a stronger market here. The quotation in New York yesterday was 31.60c., those in London to-day are £143 7s. 6d. for spot and £144 15s. for futures. The quantity afloat is 2125 tons and there arrived this month 2914 tons.

Lead.—In the week there has been scarcely any movement, but the market is fairly steady, the pressure to sell, which was evident a week ago, having been removed. The New York price is unchanged at 3.90c. and that of St. Louis, 3.75c., although it is possible that 3.72½c. might be accepted if offered. The market here has been supported by London where a scarcity exists. Were it not for this influence it is thought that domestic prices would decline.

Spelter.—Quotations are unchanged at 5c., New York, and 4.85c., St. Louis, in a market that continues dull and almost entirely without interesting features. In the week a 40-ton car was sold under the rule on the floor of the New York Metal Exchange and 4.80c., St. Louis, was realized. While most of the sellers are holding to 5c., New York, or 4.85c., St. Louis, these prices probably could be shaded.

Antimony.—Prices are unchanged at about 7c. for Cookson's, 6.75c. for Hallett's and 5.40c. to 6c. for other grades. There are no features worthy of comment.

Old Metals.—The market is very quiet with unchanged quotations. Dealers' selling prices are nominally as follows:

	Cents per lb.
Copper, heavy and crucible	13.00 to 13.25
Copper, heavy and wire	12.50 to 12.75
Copper, light and bottoms	11.50 to 11.75
Brass, heavy	8.50 to 8.75
Brass, light	7.00 to 7.25
Heavy machine composition	11.50 to 12.00
Clean brass turnings	8.50 to 8.75
Composition turnings	9.75 to 10.25
Lead, heavy	3.70
Lead, tea	3.40
Zinc scrap	3.85

Chicago

JULY 20.—The metal market continues to drag. Although there has been a considerable quantity of copper sold, the larger users apparently considering present prices a desirable basis upon which to buy, quotations have shown no great strength. A scarcity in the supply of tin has bolstered up prices and an advance is noted. The weakness in spelter quotations appears to be more acute, sellers making even greater concessions than have been previously reported. We quote as follows: Casting copper, 14.87½c.; Lake copper, 14.12½c. for prompt shipment; small lots, ⅛c. to ¼c. higher; pig tin, carloads, 33.25c.; small lots, 36.25c.; lead, desilverized, 3.85c., and corroding, 4.10c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 4.85c. to 4.90c.; Cookson's antimony, 9.50c. for cask lots; other grades, 8c.; sheet zinc, $7, f.o.b. La Salle or Peru, Ill., less 8 per cent. discount in carloads of 600-lb. casks. On old-metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 11.25c.; copper bottoms, 10c.; copper clips, 10.50c.; red brass, 10.50c.; yellow brass, 7.25c.; lead pipe, 3.30c.; zinc, 3.50c.; pewter, No. 1, 23c.; tinfoil, 26c.; block tin pipe, 27c.

St. Louis

JULY 20.—The metal markets have dragged and prices are no better than at last reports, spelter closing slightly lower Saturday at 4.80c. with little doing and Missouri lead dull and nominal at 3.75c. On Monday, however, spelter stiffened suddenly to 4.85c. to 4.90c., with some heavy transactions. Tin is slightly firmer at 32.10c. to 32.35c.; Lake copper nominal, 14.10c. to 14.25c.; electrolytic copper quiet, 13.97½c. to 14.10c.; Cookson's antimony, dull, 7.47½c. to 7.60c. In the Joplin ore market there was a weaker tendency as a result of the situation in the metal market, and the price range for 60 per cent. zinc blende was $35 to $38.50 per ton with the choicest ores selling on settlement at $42 per ton. There was quite a large proportion of the output that brought $40 on settlement. Calamine was rather quiet with the price $20 to $22 per ton for 40 per cent. with the choicest lots selling on settlement as high as $26 per ton. Lead ore was quiet at $46 per ton for 80 per cent. Miscellaneous scrap metals we quote as follows: Light brass, 5.50c.; heavy yellow brass, 7.50c.; heavy red brass and light copper, 9.50c.; heavy copper and copper wire, 10.50c.; zinc, 3c.; lead, 3.25c.; pewter, 21c.; tinfoil, 25c.; tea lead, 3c.

Iron and Industrial Stocks

NEW YORK, July 22, 1914.

In the past week the New York stock market has been dominated by reports that the railroad rate decision would be much more unfavorable to the railroads than had been commonly expected. Railroad stocks declined in consequence. Industrial stocks showed more resistance, though they shared in the decline. Crop expectations have been little shaken by the news of the week, but there have been reports of damage to spring wheat. On Tuesday, July 21, the volume of business increased and stocks advanced generally, due to the covering of shorts and to the belief that unfavorable factors had been more than recognized in the declines of the preceding week. The range of prices on active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com.	9 - 10	Nat. En. & St., com.	10¼
Allis-Chal., pref.	41	P'gh Steel, pref.	87½
Am. Can, com.	25⅞ - 27⅛	Pressed St'l, com.	42⅛ - 43¾
Am. Can, pref.	89⅞ - 90	Pressed St'l, pref.	102¾
Am. Car & Fdy., com.	50½ - 51¾	Republic, com.	21 - 22
Am. Car & Fdy., pref.	118½-118¾	Republic, pref.	84⅛ - 85½
Am. Loco., com.	29 - 29¾	Rumely Co., com.	9½ - 10
Am. Loco., pref.	97¼ - 98	Rumely Co., pref.	27 - 27⅛
Am. St'l Fdries.	31 - 32	Sloss, com.	27
Bald. Loco., pref.	106⅞-107½	Pipe, com.	31 - 31⅛
Beth. Steel, com.	39½ - 41	U. S. Steel, com.	59⅝ - 61⅝
Beth. Steel, pref.	84¼ - 85	U. S. Steel, pref.	109⅜-109⅞
Case (J.I.), pref.	85⅛ - 85⅜	West'g'h'se Elec.	77½ - 79½
Colorado Fuel	25 - 25⅝	Am. Ship, com.	33
Deere & Co., pref.	92½ - 93	Chic. Pneu. Tool	53
General Electric	146½-148½	Cambria Steel	47½ - 48⅜
Gt. N. Ore Cert.	29½ - 31	Lake Sup. Corp.	15 - 15⅞
Int. Harv., com.	105 -106⅞	Pa. Steel, pref.	64½
Int. Harv., pref.	117⅞	Warwick	9⅝
Int. Harv., Corp.	102½-104	Cruc. Steel, com.	15½ - 15¾
Int. Harv., Corp., pref.	118	Cruc. Steel, pref.	91 - 91¾
Int. Pump, pref.	12	Harb. Walk Ref., pref.	99
Lackawanna St'l	30¼ - 30½	La Belle Iron, com.	30 - 30⅜

In the course of a recent visit to this country Carl Pape, managing director of the Bolinders Company, Stockholm, Sweden, completed arrangements for the sale of the Bolinders crude oil engine in the United States. The company is represented in New York by W. R. Haynie, 30 Church street, and the business will be handled here under the name of the Bolinders Company, New York, of which Mr. Haynie is the manager. He states that the Bolinders engine is built in various types, marine, stationary and portable, from 25 to 300 hp. Preparations are being made for the stocking of a warehouse in New York. The Bolinders crude oil engine is of the two-cycle type, delivering a power impulse for each revolution of the flywheel and has no valves, cams, gears or electric sparking device. The explosion is caused in an igniterball which is heated to a dull red heat by a blow lamp.

W. R. Haynie, United States representative of Carels Freres, Ghent, Belgium, whom he has represented for two years in this country in the development of their engine business, has made arrangements with the Nordberg Mfg. Company, Milwaukee, Wis., by which that company will take over the exclusive manufacturing rights and sale of these engines in the United States. The engines are particularly suited for large industrial plants.

Steel Output in 1913 Close to That of 1912

Total Production of Ingots 30,280,130 Tons, Against 30,284,682 Tons — Open Hearth Gains What Bessemer Loses

The Bureau of Statistics of the American Iron and Steel Institute, William G. Gray, statistician, has received from the manufacturers statistics of the production of all kinds of steel ingots and castings in the United States in 1913. The production of all kinds of steel ingots and castings in 1913 amounted to 31,300,874 tons, against 31,251,303 tons in 1912. While the production in 1913 was the largest in the country's history, it was only 49,571 tons greater than the output in 1912. Of the total production in 1913, 30,280,130 tons were ingots and 1,020,744 tons were castings, against 30,284,682 tons of ingots and 966,621 tons of castings in 1912. The following table gives by states the production of all kinds of steel ingots and castings by processes in 1913:

States—all kinds of steel ingots and castings—gross tons	Bessemer	Open-hearth	Crucible and all other	Total ingots and castings
Mass., Rhode Island, and Conn.	2,476	195,419	2,716	200,611
New York and New Jersey	371,372	996,312	39,032	1,406,716
Pennsylvania	2,954,818	12,522,227	77,249	15,554,294
Del., Md., Dist. of Col., Va., W. Va., Ky., Ga., Ala., Tenn., La., Tex.	637,063	1,183,977	1,285	1,822,325
Ohio	4,024,662	2,726,219	4,170	6,755,051
Indiana and Illinois	1,475,424	3,444,960	20,600	4,940,984
Mich., Wis., Minn., Mo., Iowa, Utah, Kan., Col., Ore., Wash., Cal., and Canal Zone, Panama	79,891	530,817	10,185	620,893
Total for 1913	9,545,706	21,599,931	155,237	31,300,874
Total for 1912	10,327,901	20,780,723	142,679	31,251,303

In 1913 there were 304 works in 30 states, the District of Columbia, and the Canal Zone, Panama, which made steel ingots or castings, as compared with 306 works in 31 states, the District of Columbia and the Canal Zone, Panama, in 1912.

Included in the total for 1913 are about 714,357 tons of ingots and castings which were treated with ferro-vanadium, ferro-titanium, ferro-chrome, nickel, or other alloys, of which about 625,430 tons were ingots and about 88,927 tons were castings, as compared with about 792,501 tons in 1912, of which about 689,392 tons were ingots and about 103,109 tons were castings. Of the total in 1913 about 74,924 tons were Bessemer steel ingots or castings, about 599,890 tons were open-hearth, about 28,279 tons were crucible, about 11,254 tons were electric, and about 10 tons were miscellaneous.

PRODUCTION OF STEEL INGOTS

The total production of all kinds of steel ingots in 1913, not including steel castings, amounted to 30,280,130 tons, against 30,284,682 tons in 1912, a decrease of 4552 tons. The production in 1912 was the largest in our history. The following table gives the output of all kinds of steel ingots by processes in 1913:

States—ingots only—gross tons	Bessemer ingots	Open-hearth ingots	Crucible and all other	Total ingots, gross tons
Mass., R. I., Conn., N. Y., & N. J.	358,504	1,112,749	38,176	1,509,429
Pennsylvania	2,942,070	12,160,867	70,268	15,173,205
Md., D. of C., W. Va., Ky., Ga., Ala.	628,859	1,163,533	.....	1,792,392
Ohio	4,016,664	2,578,295	.....	6,594,959
Indiana, Ill., Col., Utah and Cal.	1,519,103	3,674,271	16,771	5,210,145
Total for 1913	9,465,200	20,689,715	125,215	30,280,130
Total for 1912	10,259,151	19,909,875	115,656	30,284,682

Of the 625,430 tons of steel ingots treated with ferro-vanadium, ferro-titanium, ferro-chrome, nickel, or other alloys, as stated above, about 53,751 tons were Bessemer ingots, about 535,577 tons were open-hearth, about 25,281 tons were crucible, and about 10,821 tons were electric.

PRODUCTION OF STEEL CASTINGS

In 1913 the production of all kinds of steel castings amounted to 1,020,744 tons, against 966,621 tons in 1912, an increase of 54,123 tons, or nearly 5.6 per cent. The following table gives the production by processes in 1913:

States—castings only—gross tons	Bessemer castings	Open-hearth castings	Crucible and all other	Total castings
Mass., Conn., New York and N. J.	15,344	78,982	3,572	97,898
Pennsylvania	12,748	361,360	6,981	381,089
Del., Md., Dist. of Col., Va., W. Va., Ky., Tenn., Ga., Ala., La., Texas, and Ohio	16,202	168,368	5,455	190,025
Indiana, Illinois, and Michigan	18,588	194,406	6,078	219,072
Wis., Minn., Iowa, Mo., Kan., Col., Utah, Ore., Wash., Cal., and Canal Zone, Panama	17,624	107,100	7,936	132,660
Total for 1913	80,506	910,216	30,022	1,020,744
Total for 1912	68,750	870,848	27,023	966,621

Of about 88,927 tons of steel castings treated with ferro-vanadium, ferro-titanium, or other alloys, about 21,173 tons were Bessemer castings, about 64,313 tons were open-hearth, about 2998 tons were crucible, and about 443 tons were electric and miscellaneous.

BESSEMER STEEL

The production of Bessemer steel ingots and castings in 1913 amounted to 9,545,706 tons (9,465,200 tons of ingots and 80,506 tons of castings), against 10,327,901 tons in 1912 (10,259,151 tons of ingots and 68,750 tons of castings), a decrease of 782,195 tons, or over 7.5 per cent. The maximum production was reached in 1906, when the output amounted to 12,275,830 tons. Of the 1913 total 9,465,882 tons were made by the standard Bessemer process, 42,408 tons by the Tropenas process, and 37,416 tons by other modifications of the standard Bessemer process. An accompanying table gives the production by States of Bessemer steel ingots and castings from 1908 to 1913. With the exception of 335 tons all the ingots produced in 1913 were made by the standard Bessemer process. Of the total production of steel castings in 1913 only 1017 tons were made by the standard process. The production of castings in that year by the Tropenas process amounted to 42,373 tons and by the Bretaud, Zenzes and other modified Bessemer processes to 37,116 tons.

Of the total of 80,506 tons of Bessemer steel castings in 1913, Ohio produced 7998 tons, Pennsylvania 12,748 tons, Illinois 13,625 tons and Massachusetts, New York, Maryland and other States 46,135 tons.

CRUCIBLE, ELECTRIC AND MISCELLANEOUS STEEL

The production of crucible steel in 1913 amounted to 121,226 tons, against 121,517 tons in 1912, a decrease of 291 tons. The maximum production was reached in 1907 at 131,234 tons. In the total for 1913 are included about 28,279 tons of crucible steel which was treated with ferrovanadium, ferrotitanium, ferrochrome, or other alloys, of which about 25,281 tons were ingots and about 2998 tons were castings. In 1912 the production of alloy-treated crucible steel amounted to about 30,761 tons—27,553 tons of ingots and 3208 tons of castings. The following table gives by States the production of crucible steel ingots and castings in 1913:

States—Crucible steel—gross tons	Ingots	Castings	Total
Pennsylvania	69,200	1,415	70,615
Mass., Conn., N. Y., Ohio, Mich., Wis., etc.	34,455	16,156	50,611
Total for 1913	103,655	17,571	121,226
Total for 1912	100,967	20,550	121,517

The production of steel by the electric process in 1913 amounted to 30,180 tons, as compared with 18,309 tons in 1912, an increase of 11,871 tons, or over 64.8 per cent. The following table gives the production of electric steel ingots and castings since 1909:

Years—Electric steel—gross tons	Ingots	Castings	Total
1909	13,456	306	13,762
1910	50,821	1,320	52,141
1911	27,227	1,878	29,105
1912	14,147	4,162	18,309
1913	20,973	9,207	30,180

In the total production of electric steel in 1913 are included about 11,254 tons of steel ingots and castings which were treated with ferrovanadium, ferrotitanium, ferrochrome, etc.—about 10,821 tons of ingots and 433 tons of castings.

On December 31, 1913, the number of plants equipped to manufacture steel by the electric process was 19, as compared with 14 plants at the close of 1912. In addition 3 plants were being built on December 31, 1913—1 in New York, 1 in Pennsylvania, and 1 in Oregon—and 7 plants were projected—1 in New York, 1 in New Jersey, 2 in Pennsylvania, 1 in Tennessee, 1 in Ohio, and 1 in Michigan.

The production of steel in 1913 by various minor processes amounted to 3831 tons, against 2853 tons in 1912. Of the production in 1913 about 587 tons were ingots and about 3244 tons were direct castings.

Basic and Acid Open-Hearth Castings

Of the total of 910,216 tons of open-hearth steel castings last year 460,161 tons were made by the basic process and 450,055 tons by the acid process. In the former the increase in 1913 was 16,163 tons; by the acid process the increase was 23,205 tons. The following table gives the distribution of basic and acid open-hearth castings by States:

States—castings only—gross tons	Basic castings	Acid castings	Total, Gross tons
New England, New York and New Jersey	36,049	42,933	78,982
Pennsylvania	90,000	271,360	361,360
Ohio	106,582	41,342	147,924
Indiana and Illinois	140,809	41,737	182,546
W. Va., Mich., Wis., Col., and other States	86,721	52,683	139,404
Total for 1913	460,161	450,055	910,216
Total for 1912	443,998	426,850	870,848

Duplex Process

Included in the 20,344,626 tons of basic open-hearth steel ingots and castings produced in 1913 are 2,210,718 tons of duplex steel ingots and castings which were made from metal partly purified in Bessemer converters and finally purified in basic open-hearth steel furnaces, against 1,438,654 tons in 1912, an increase of 772,064 tons, or over 53.6 per cent. In 1913 duplex steel ingots and castings were produced by nine works in five States, as follows: New York, 1; Pennsylvania, 5; Maryland, 1; Alabama, 1; and Illinois, 1; against seven works in four States in 1912, namely, four in Pennsylvania, and one each in Maryland, Alabama, and Illinois.

Production of Bessemer Steel Ingots and Castings in 1908-1913

States—Gross tons	1908	1909	1910	1911	1912	1913
Ohio	1,955,446	3,466,077	3,314,053	3,268,994	4,285,673	4,024,662
Pennsylvania	2,106,382	2,845,602	2,975,750	2,338,813	3,157,928	2,954,818
Illinois	1,237,747	1,632,444	1,693,053	1,335,053	1,559,576	1,475,274
Other States	817,180	1,386,660	1,429,916	1,004,994	1,324,724	1,090,952
Total	6,116,755	9,330,783	9,412,772	7,947,854	10,327,901	9,545,706

Production of Open-Hearth Steel Ingots and Castings in 1908-1913

States—Gross tons	1908	1909	1910	1911	1912	1913
New England	158,417	257,392	223,158	189,879	214,325	195,419
N. Y. and N. J.	350,348	618,117	713,245	679,152	792,201	996,312
Pennsylvania	5,322,229	9,400,287	10,153,816	9,594,914	12,408,109	12,522,227
Del., Md., and Dist. of Col.	28,689	35,285	158,827	128,309	44,079	186,961
West Va., Ky., Ga., and Ala.	470,407	477,365	738,392	636,625	967,557	997,016
Ohio	525,171	1,424,452	1,733,409	1,721,549	2,565,343	2,726,219
Indiana	167,299	783,957	1,307,129	1,394,520	2,001,937	2,189,106
Illinois	483,104	1,052,572	995,011	801,624	1,235,166	1,264,854
Mich. and Wis.	19,615	28,512	38,638	27,993	41,827	44,173
Other States	311,450	415,997	442,884	424,085	510,179	486,644
Total	7,836,729	14,493,936	16,504,509	15,598,650	20,780,723	21,599,931

OPEN-HEARTH STEEL

The total production of open-hearth steel ingots and direct castings in 1913 amounted to 21,599,931 tons, against 20,780,723 tons in 1912, an increase of 819,208 tons, or over 3.9 per cent. In 1908 the production of open-hearth steel for the first time exceeded the production of Bessemer steel, the excess amounting to 1,719,974 tons, or over 28.1 per cent. In 1913 the output of open-hearth steel exceeded the output of Bessemer steel by 12,054,225 tons, or over 126.2 per cent. Of the total production of open-hearth steel in 1913, 20,689,715 tons were ingots and 910,216 tons were castings, against 19,909,875 tons of ingots and 870,848 tons of castings in 1912. An accompanying table gives the production of open-hearth steel by States since 1908.

Basic and Acid Open-Hearth Ingots

The production of open-hearth ingots in 1913 by the basic process amounted to 19,884,465 tons, as compared with 19,197,504 tons in 1912, an increase of 686,961 tons, or over 3.5 per cent., while the production by the acid process in 1913 amounted to 805,250 tons, as compared with 712,371 tons in 1912, an increase of 92,879 tons, or over 13 per cent. The statistics of open-hearth ingots by States for 1913 are given below:

States—ingots only—gross tons	Basic ingots	Acid ingots	Total, gross tons
New England, New York, and New Jersey	1,020,211	92,538	1,112,749
Pennsylvania	11,488,352	672,515	12,160,867
Ohio, Indiana, and Illinois	5,800,512	40,197	5,840,709
Md., W. Va., Ky., Ala., Col., and other States	1,575,390	.....	1,575,390
Total for 1913	19,884,465	805,250	20,689,715
Total for 1912	19,197,504	712,371	19,909,875

PLANTS BUILDING AND PROJECTED

At the close of 1913 there were 183 completed open-hearth steel plants, of which 158 were active during the year and 25 were idle. Of the total, 119 were equipped to make basic steel, of which 105 were active during the year and 14 were idle; and 93 were equipped to make acid steel, of which 76 were active and 17 were idle. Some of the plants were equipped to make both basic and acid steel. Seven plants were being built on December 31, 1913, located as follows: Pennsylvania, 1; District of Columbia, 1; Ohio, 3; Indiana, 1; and Minnesota, 1. On the same date work had been suspended upon 1 partly erected plant. In addition 5 plants were projected, namely, 1 in West Virginia and 4 in Ohio.

On December 31, 1913, 110 plants were equipped to make steel by the standard Bessemer process or some of its modifications, as compared with 102 plants on December 31, 1912, an increase of 8 plants. At the close of 1913 thirty plants were equipped to make steel by the standard Bessemer process, 39 plants by the Tropenas process, and 41 plants by other modifications of the standard Bessemer process, while at the close of 1912 thirty plants were equipped to make steel by the standard Bessemer process, 35 by the Tropenas process, and 37 by other modifications of the standard Bessemer process. On December 31, 1913, one small Bessemer steel plant was being built in Pennsylvania. On December 31, 1913, 8 modified Bessemer plants were projected.

PERSONAL

T. I. Crane, Pilling & Crane, Philadelphia, sailed for Europe July 18. He will return in September.

J. F. Haig has resigned as purchasing agent of the Pennsylvania Steel Company, Philadelphia, and has returned to the purchasing department of the Pennsylvania Railroad, which he left to go to the steel company. Mr. Haig has been succeeded by W. B. Enck, formerly assistant to the purchasing agent of the Cambria Steel Company.

Harry N. Clarke, who for five years has been connected with the Warner & Swasey Company, Cleveland, Ohio, last holding the position of supervisor of labor, has resigned that position to become secretary and treasurer of the F. W. Wolf Company, dealer in photographic supplies. The officers and department heads of the Warner & Swasey Company gave Mr. Clarke a farewell dinner and presented him with a set of field glasses.

Dwight E. Woodbridge has been made chairman of a new sub-committee of the Iron and Steel Committee of the American Institute of Mining Engineers, known as the Iron Ore Subcommittee. Other members are John Birkinbine, Philadelphia; E. F. Burchard, U. S. Geological Survey, Washington, D. C.; William Kelly, Vulcan, Mich.; Charles F. Rand, New York; B. W. Vallat, Detroit, and F. A. Vogel, New York. Mr. Woodbridge's office address is now 25 Broad street, New York.

William Weinstein, formerly with the William Weinstein Iron Company, is now connected with the Consolidated Rail & Iron Company, 1012 Hartford Building, Chicago.

Thomas H. Edwards has been made superintendent of the steel department of the Wheeling Steel & Iron Company. He was with the National Tube Company, McKeesport, Pa., for several years, and comes to Wheeling from Pueblo, Colo., where he had charge of the converter department of the Colorado Fuel & Iron Company.

Ross H. McMaster, Montreal, has been elected a director of the Steel Company of Canada, Hamilton, Ont., to fill the vacancy created by the death of the late Senator Gibson.

Arthur F. Braid, metallurgical engineer, who has been connected with the Chicago office of the Goldschmidt Thermit Company, has resigned his position to interest himself in the Walker Starter Company, which manufactures starters for automobiles, tractors and motor boats, with a factory at Lacon, Ill. Mr. Braid will become sales manager of the Cleveland district. His place with the Goldschmidt Thermit Company will be taken by H. G. Spilsbury, who has been associated with the Dwight & Lloyd Sintering Company, New York.

Rudolf Kauert, of Kauert & Doehlert, machine tool dealers of Montreal and Toronto, has returned home after a trip of several weeks abroad.

S. F. Kent has been appointed works manager of the Lodge & Shipley Machine Tool Company, Cincinnati, Ohio.

Albert Pott, sales manager of the Baird Machine Company, Bridgeport, Conn., sailed from New York on July 15, on the steamship La France for a two-months' trip through the British Isles and France. He plans to visit the foreign representatives of the company.

Dr. John Price Jackson, president of the Engineers Society of Pennsylvania and State commissioner of labor and industry, has sailed for several weeks' tour of industrial districts in Belgium, France and Germany.

L. H. Shoemaker has been appointed division engineer of the American Bridge Company, Pittsburgh, to succeed Richard Khuen, Jr., who was transferred to the erecting department.

OBITUARY

EDWARD O. SCHERNIKOW died in Seaford, England, July 21, the announcement being made in a cablegram received in New York that day. Mr. Schernikow was for 30 years engaged in the building of coffee and rice plantation machinery in this country. About 30 years ago he entered into partnership with Marcus Mason, the firm being known as Marcus Mason & Co., with a factory at Worcester, Mass. Mr. Mason was a pioneer in the development of plantation machinery and on his death a few years ago Mr. Schernikow purchased the business outright and conducted it until a few years ago, when he disposed of it. Because of failing health he went abroad three years ago. He was 51 years of age and was born in New York. He was well known in the New York market in connection with his purchases of supplies to be forwarded with the machinery he manufactured to plantations in the West Indies, Central America and South America.

J. WEIDNER MURRAY, for some years Pittsburgh representative of the Allis-Chalmers Company, died at his home in Pittsburgh, July 15, from heart failure. He was born in Lebanon, Pa., and went to Pittsburgh in 1876 with the Keystone Bridge Works. Later he became identified with the Weimer Machine Works, Lebanon, and then moved to Birmingham, Ala., to become mechanical engineer of the Tennessee Coal, Iron & Railroad Company. He was a member of the American Iron and Steel Institute, the American Society of Mechanical Engineers, and the Engineers' Society of Western Pennsylvania.

MORRIS G. LODER, sales manager of the branch store of the Carborundum Company at Cleveland, died after a long illness, on Thursday, July 9, aged 41 years. He was born at Strongville, Ohio, near Cleveland. For some years he was connected with the purchasing department of the Deering Harvester Company, Chicago. He entered the employ of the Carborundum Company as sales manager of the Cleveland branch store in 1902.

CHARLES SPARKS, general manager of the Michigan Copper & Brass Rolling Mills, Detroit, Mich., died suddenly at St. Louis, July 16, following a nervous breakdown. He had been connected with the Michigan Copper & Brass Rolling Mills since its organization eight years ago and previously had been identified with the Simmons Hardware Company of St. Louis.

EDWARD B. COLBY, president of E. B. Colby & Co., stove manufacturers, Jersey City, died in Christ Hospital, Jersey City, July 20, following a stroke of apoplexy in his office a few hours before. He was 58 years of age. He is survived by his widow, two daughters and a son.

A. J. JUDGE, who founded in St. Louis the McMurry & Judge Architectural Iron Company, died in Kansas City, Mo., July 16, aged 79 years. He was at the time superintending steel work on the new Muehlbach Hotel in that city. He was born in Kingston, Jamaica.

W. W. CULVER, who died recently in St. Louis, was for years previous to his retirement president of the Wrought Iron Range Company, St. Louis. He was born near Columbus, Ohio, 80 years ago, and began in the stove business in 1862.

THOMAS B. LAPPAN, president of the James Lappan Mfg. Company, proprietor of the Iron City Boiler Works, Pittsburgh, died at his home in that city, July 15, aged 51 years. He was a son of James Lappan, the founder of the company.

JAMES M. ROWLAND, of Maxwell Rowland & Co., shovel makers, Holmesburg, Philadelphia, died suddenly from heart disease July 16 at his home, 7909 Frankford avenue, Philadelphia. He was 68 years old.

ARCHIBALD F. LAW, vice-president of the Temple Iron Company, died at his home in Scranton, Pa., July 18, aged 58 years.

Clayton Bill as Reported to Senate

WASHINGTON, D. C., July 21, 1914.—The Senate Judiciary Committee, after six weeks spent in the consideration of the Clayton omnibus anti-trust bill, to-day reported that measure to the Senate with important amendments. Sections 7 and 18, which in the House bills exempted labor and other organizations from the operation of the anti-trust laws and forbade the issuance of injunctions to prevent many acts commonly resorted to by strikers and their sympathizers, have been amended as foreshadowed in this correspondence a fortnight ago. The leaders of organized labor here, relying upon the announcement that the Senate Committee would amend these two important provisions along conservative lines, have already started a nation-wide movement to induce the Senate to reject the amendment added by the Judiciary Committee and, in the event of failure in this, to force the conference committee to accept the House bill in preference to the measure as passed by the Senate. If, therefore, the employers of the country fail to acquaint their Senators and Representatives with the importance of the modification of the House bill as suggested by the Judiciary Committee, they will have no one but themselves to blame should the conference committee reject the Senate amendments in favor of the House bill.

SECTION EXEMPTING LABOR ORGANIZATIONS

The text of section 7 as tentatively agreed to by the Senate Judiciary Committee a fortnight ago and printed in *The Iron Age*, has been adopted by the committee in its final report to the Senate with minor modifications. Fraternal and consumers' organizations have been stricken from the section so that it is limited to labor, agricultural or horticultural organizations. The section as reported is as follows, the words stricken out of the House bill being enclosed in brackets and the new language inserted by the Senate committee being in italics:—

Sec. 7. That nothing contained in the anti-trust laws shall be construed to forbid the existence and operation of [fraternal,] labor, [consumers,] agricultural, or horticultural organizations, [orders or associations,] instituted for the purpose of mutual help, and not having capital stock or conducted for profit, or to forbid or restrain individual members of such organizations, [orders, or associations] from *lawfully* carrying out the legitimate objects thereof; nor shall such organizations, [orders, or associations,] or the members thereof, be held or construed to be illegal combinations or conspiracies in restraint of trade, under the anti-trust laws.

The insertion of the word "lawfully" by the Senate committee has completely changed the character of the provision as passed by the House and has rendered it so distasteful to the leaders of organized labor that they have decided to fight it both in the Senate and in conference to the full limit of their resources. In striking from the section the words "fraternal" and "consumers" the Senate committee has further emphasized the discrimination in favor of labor and farmers' organizations, and, in the opinion of many lawyers here, has greatly increased the probability that the United States Supreme Court will invalidate the entire section on constitutional grounds.

SECTION DEALING WITH INJUNCTIONS

The text of section 18, dealing with injunctions, has been reported by the Senate committee in almost exactly the language of the tentative agreement heretofore published in *The Iron Age*. The provision legalizing picketing has been stricken from the bill and the provision relating to boycotts has been rendered harmless. The section in its entirety, instead of legalizing the acts enumerated, merely declares that they are not to be held as violations of the anti-trust laws, thus leaving the employer his full rights under other statutes and the common law.

It is now expected that the Senate will combine the interstate trade commission bill, the Clayton bill and the railroad securities bill in a single measure which will be sent to conference as a substitute for the three House bills. This means that there will be ample opportunity for record votes in the Senate on sections 7 and 18 and a chance for the display of the same tactics by labor leaders that were employed to force the exemptions secured in the House.

The conference committee which will have the final settlement of the question will probably be composed of Senators Culberson, Texas; Overman, North Carolina, and Clarke, Wyoming, and Representatives Webb, North Carolina; Carlin, Virginia, and Volstead, Minnesota. It is possible that as the trade commission bill and the railroad securities bill were framed by the House Committee on Interstate and Foreign Commerce the conference committee may be enlarged to include two members of that committee, presumably Representatives Adamson, Georgia, and Stevens, Minnesota, and Senators Newlands, Nevada, and Clapp, Minnesota. The debate in the Senate promises to occupy at least a month. W. L. C.

Pittsburgh and Nearby Districts

The Union Drawn Steel Company, Beaver Falls, Pa., has opened a sales office in the Dime Bank Building, Detroit, Mich., in charge of Walter J. Bothwell, formerly assistant general manager of sales, who has been made district sales manager for the territory of which Detroit is the center.

The Pittsburgh Iron & Steel Foundries Company, Pittsburgh, Pa., works at Midland, Pa., has licensed the United Engineering & Foundry Company, of Pittsburgh, to manufacture and sell Adamite rolls.

J. Kirk, an attorney, has been appointed receiver of the Sligo Iron & Steel Company at Uniontown on the petition of Charles Davidson, the largest holder of bonds. The liabilities of the company are said to exceed $150,000.

The American Sterilizer Company, Erie, Pa., is building a new foundry at a cost of $7500.

The Carnegie Steel Company, Pittsburgh, is increasing its blast furnace operations. On July 17, No. 4 Duquesne furnace was blown in; on July 21 No. 5 Carrie furnace was started, and one Ohio stack at Youngstown will be put in operation in a few days. When this last stack starts, the Carnegie Steel Company will be operating 33 blast furnaces and will have 25 idle.

In the courts at Pittsburgh this week an application was filed for a charter by the United States Steel and Carnegie Pension Fund, an organization formed 14 years ago by the United States Steel Corporation and its subsidiary interests for the benefit of its employees who may be injured or who have remained in the service of the companies for a specified length of time. The charter sets forth that the yearly income of the corporation, from other sources than real estate, shall not exceed $1,000,000 and the corporation shall have no capital stock.

On Saturday, July 18, stockholders of the Wheeling Steel & Iron Company, Wheeling, W. Va., and the Wheeling Sheet & Tin Plate Company, operating a tin plate plant at Yorkville, Ohio, decided to consolidate these two interests into one company. The merger means that the Wheeling Sheet & Tin Plate Company has been taken over by the Wheeling Steel & Iron Company. Isaac M. Scott, now president of the Wheeling Sheet & Tin Plate Company, will become president of the Wheeling Steel & Iron Company, succeeding C. R. Hubbard, former president, who will remain in an advisory capacity. Stockholders of the Wheeling Steel & Iron Company also voted to increase the capital stock from $5,000,000 to $7,500,000, the increase to provide funds for the purchase of the works of the Wheeling Sheet & Tin Plate Company; also to provide money for some extensive additions to the plant of the Wheeling Steel & Iron Company, now being considered.

A new company for making electric steel castings has been organized in England under the name of Electro Steel Foundries, Ltd., to be located at Darlaston, South Staffordshire. The Rheinische Electrostahlwerke of Bonn, Germany, has been instrumental in forming this company. It is intended to install Stassano electric furnaces, this being the type used by the German foundry. The German company will be represented on the board of the new one.

Plate, Sheet and Tin Plate Production in 1913

Some Falling Off from the High Record of 1912—A New Classification Adopted for Plates and Sheets

The Bureau of Statistics of the American Iron and Steel Institute has received from the manufacturers statistics of the production of iron and steel plates and sheets, black plates, or sheets, for tinning, and tinplates and terne plates in the United States in 1913, and these are given in its bulletin No. 6.

Plates and Sheets

The production of iron and steel plates and sheets in 1913, excluding nail plate and skelp, but including black plates, or sheets, for tinning, amounted to 5,751,037 tons, against 5,875,080 tons in 1912, a decrease of 124,043 tons, or over 2.1 per cent. The maximum production was reached in 1912. The year of next largest production was 1913. The production of nail plate and skelp will be given later.

The following table gives the production by States of plates and sheets from 1910 to 1913. Tie plates are included for 1910 and 1911, but not for 1912 or 1913.

States—Gross tons	1910	1911	1912	1913
New Eng., N. Y., & N. J.	141,999	106,298	108,477	103,671
Pennsylvania	2,808,883	2,405,247	3,166,872	3,115,796
Delaware and Maryland	23,863	22,060	19,488	14,413
West Virginia	225,649	246,893	317,718	298,789
Kentucky and Alabama	69,610	67,930	65,598	82,385
Ohio	1,052,414	1,168,879	1,493,825	1,327,913
Ind., Ill., Wis., Mo., Wyo. and Cal.	633,066	470,742	703,102	808,070
Total	4,955,484	4,488,049	5,875,080	5,751,037

In 1913 there were 127 works in 15 States which rolled plates or sheets, against 131 works in 14 States in 1912, 139 works in 15 States in 1911, 150 works in 17 States in 1910, and 141 works in 17 States in 1909.

NEW CLASSIFICATION OF PLATES, SHEETS AND BLACK PLATES

At the request of the manufacturers a new plate and sheet classification was adopted in collecting the 1913 statistics. This classification is given below. It will not therefore be possible to compare separately the plate or the sheet output in 1913, under the new classification, with the plate or the sheet output in 1912, under the old classification. For 1912 and preceding years, the plate statistics represented No. 12 gauge and thicker, and the sheet statistics No. 13 and thinner. In that year the production of plates was 3,035,200 tons, of which 33,349 tons was iron, and the production of sheets was 2,839,880 tons, of which 41,695 tons was iron.

The following table gives the production in 1913 of iron and steel universal plates (including flats or bars over 6 inches wide), sheared plates rolled on single stands of rolls, and sheared plates roughed and finished on separate stands of rolls, the output in each case of plates ¼ in. thick and over being separately reported from the output under ¼ in. thick. In addition the production of black sheets made on either sheet or jobbing mills is given by gauges; also the production of black plates, including black plates for tinning and all other black plate specialties rolled on tin mills. The output of nail and spike plate or skelp is not included.

Combining the two classes of sheared plates gives a total output in 1913 of 1,844,354 gross tons, of which 3484 tons were iron and 1,840,870 tons steel. The total output of sheared plates ¼ in. and over in thickness was 1,432,254 tons, of which 2302 tons were iron and 1,429,952 tons were steel, while the total output under ¼ in. thick was 412,100 tons, of which 1182 tons were iron and 410,918 tons were steel.

To the total output of plates and sheets in 1913 universal plates contributed about 20.1 per cent.; sheared plates, rolled on single stands of rolls, about 24.3 per cent.; sheared plates, roughed and finished on separate stands of rolls, about 7.8 per cent.; black sheets, made on either sheet or jobbing mills, about 29.9 per cent.; and black plates, including black plates for tinning, and all other black plate specialties rolled on tin mills, about 17.9 per cent.

Kinds of products—gross tons	Iron	Steel	Total
Universal plates, inc. flats or bars over 6 in. wide:			
¼ of an inch and over in thickness	1,565	1,108,509	1,110,074
Under ¼ of an inch thick	.....	48,342	48,342
Total universal plates	1,565	1,156,851	1,158,416
Sheared plates, rolled on single stands of rolls:			
¼ of an inch and over in thickness	1,852	1,179,372	1,181,224
Under ¼ of an inch thick	732	213,671	214,403
Total	2,584	1,393,043	1,395,627
Sheared plates, roughed and fin. on sep. stands:			
¼ of an inch and over in thickness	450	250,580	251,030
Under ¼ of an inch thick	450	197,247	197,697
Total	900	447,827	448,727
Black sheets, made on either sheet or job. mills:			
No. 12 gauge and thicker	16,994	235,343	252,337
No. 13 gauge and thinner	40,577	1,424,724	1,465,301
Total black sheets	57,571	1,660,067	1,717,638
Black plates, including black plates for tinning, and also all other black plate specialties rolled on tin mills	2,109	1,028,520	1,030,629
Grand total of plates and sheets	64,729	5,686,308	5,751,037

Pennsylvania made over 69.6 per cent. of the total production of universal and sheared plates in 1913, Ohio over 10.9 per cent., Illinois over 8.3 per cent., and Indiana over 7.1 per cent. The other producers in the order of their prominence were New York, Alabama, West Virginia, Wisconsin, New Jersey, Kentucky, Massachusetts and California. Of the total universal plates produced last year, 986,907 tons were under 30 in. wide, 169,649 tons were 30 in. wide and over, but less than 48 in. and 1860 tons were 48 in. and over.

Pennsylvania made over 37.2 per cent. of the total production of black plates and black sheets in 1913, Ohio over 36.3 per cent., West Virginia over 10.1 per cent., and Indiana over 9.5 per cent. The other producers in the order of their prominence were Illinois, Kentucky, New York, Delaware, Massachusetts, Missouri and Maryland. Exports of plates and sheets were 1,038,073,401 lb. in 1913, against 1,224,207,668 lb. in 1912, and 834,114,386 lb. in 1911.

PRODUCTION OF BLACK PLATES FOR TINNING

The production of black plates, or sheets, for tinning in 1913 amounted to 827,266 gross tons, against 982,197 tons in 1912, a decrease of 154,931 tons, or over 15.7 per cent. Production reached its maximum in 1912. The year of next largest output was 1913. The following table gives the output from 1909 to 1913:

States—Gross tons	1909	1910	1911	1912	1913
Pennsylvania	398,982	427,530	483,576	563,738	476,634
Md. and West Va.	115,866	132,483	154,900	207,158	175,625
Ohio, Ind., and Ill.	181,634	152,124	157,122	211,301	175,007
Total	606,482	712,137	795,598	982,197	827,266

Of the total production in 1913 Pennsylvania made over 57.6 per cent., against nearly 57.4 per cent. in 1912, over 60.7 per cent. in 1911, over 60 per cent. in 1910, over 50.9 per cent. in 1909, and over 54.1 per cent. in 1908. West Virginia, Ohio, Indiana, Illinois, and

Maryland also made black plates, or sheets, for tinning in 1913 in the order named. In 1913 there were 30 active black plate works, as compared with 34 in 1912, 31 in 1911, 35 in 1910, 31 in 1909, and 28 in 1908. In 1913 there were 9 idle works, against 3 in 1912, 4 in 1911, 4 in 1910, 9 in 1909, and 13 in 1908.

Tin Plates and Terne Plates

From reports received from the large producers, and from estimates made for a few other makers, it is found that the production of tin plates and terne plates in 1913 amounted to about 1,845,130,000 lb., or 823,719 gross tons, against about 2,157,055,000 lb., or 962,971 tons, in 1912, a decrease of 311,925,000 lb., or 139,252 tons. As compared with 1912 the production in 1913 shows a decrease of over 14.4 per cent.

The following table gives the production of tin plates and terne plates in pounds in the calendar year 1913. Included in the total for tin plates are 5,728,000 lb. in 1913 and 7,337,000 lb. in 1912 of articles which were formed or stamped from black plates, or sheets, into shape by companies which manufacture tin plates and tinned after the completion of the stamping process.

States—lb.	Tin plates	Terne plates	Total
Pennsylvania	1,942,785,000	28,027,000	1,070,812,000
Maryland and West Virginia	291,358,000	92,409,000	383,767,000
Ohio, Indiana, Illinois, and Michigan	374,043,000	16,508,000	390,551,000
Total for 1913..	1,708,186,000	136,944,000	1,845,130,000
Total for 1912..	1,965,659,000	191,396,000	2,157,055,000

Of the total production of tin plates in 1913 about 1000 lb. were made of iron and about 1,708,185,000 lb. were made of steel. In 1912, however, steel tin plates only were produced. Of the total production of terne plates in 1913 about 6,433,000 lb. were made of iron and about 130,511,000 lb. were made of steel, as compared with about 11,259,000 lb. of iron and about 180,137,000 lb. of steel in 1912.

Of the total production of tin plates in 1913 Pennsylvania made over 61 per cent., against over 60 per cent. in 1912, and of the total production of terne plates in 1913 the same State made over 20.4 per cent., against over 42.7 per cent. in 1912. In 1913 there were 18 plants in 6 States which made tin plates but not terne plates, 4 plants in 2 States which made terne plates but not tin plates, and 13 plants in 4 States which made both tin plates and terne plates. The number of active plants in 1913 was 35, against 37 in 1912, and the number of idle plants was 7, against 5 in 1912. At the close of 1913 one tin plate plant was being built.

COKE AND CHARCOAL TIN PLATES

At the request of the manufacturers the Statistical Bureau ascertained separately for 1913 the production of coke and charcoal tin plates. The following table gives the production by States. Terne plates are not included.

States—lb.	Coke tin plates	Charcoal tin plates	Total pounds
Pennsylvania	1,027,081,000	15,704,000	1,042,785,000
Maryland and West Virginia	267,005,000	24,353,000	291,358,000
Ohio, Indiana, Ill., and Michigan	368,062,000	5,981,000	374,043,000
Total	*1,662,148,000	46,038,000	1,708,186,000

*Include 5,728,000 lb. which were formed or stamped from black plates, or sheets, by companies which manufacture tin plates, and tinned after the completion of the forming or stamping process.

The production of iron terne plates in 1913 was 6,433,000 lb. and of steel terne plates, 130,511,000 lb., a total of 136,944,000 lb.

PRODUCTION FROM THE BEGINNING

The following table gives the production of both tin plates and terne plates in the United States from the beginning of the industry in 1891 to the end of 1913. From July 1, 1891, to June 30, 1897, the statistics were collected by Col. Ira Ayer for the Treasury Department, and from July 1, 1897, to December 31, 1911, they were compiled from reliable sources of information but chiefly from the records of the American Iron and Steel Association. For 1912 and 1913 the figures were compiled by the Bureau of Statistics of the American Iron and Steel Institute.

Years—lb.	Tin plates	Terne plates	Total pounds
1891 (second 6 months)	368,400	1,868,343	2,236,743
1892 (calendar year)	13,921,296	28,197,896	42,119,192
1893	64,536,209	59,070,498	123,606,707
1894	102,223,407	64,120,002	166,343,409
1895	165,927,907	88,683,488	254,611,395
1896	270,151,785	89,058,013	359,209,798
1897 (first 6 months)	203,028,258	49,545,643	252,573,901
1897 (second 6 months)	.....	.....	323,205,619
1898 (calendar year)	.....	.....	732,289,600
1899	.....	.....	808,360,000
1900 (census year ending May 31)	707,718,239	141,285,783	*850,004,495
1901 (calendar year)	.....	.....	894,411,840
1902	.....	.....	806,400,000
1903	.....	.....	1,075,200,000
1904 (census year ending Dec. 31)	867,526,985	158,857,866	*1,032,940,706
1905 (calendar year)	.....	.....	1,105,440,000
1906	1,100,373,000	193,367,000	1,293,740,000
1907	996,650,000	156,447,000	1,153,097,000
1908	1,048,896,000	154,179,000	1,203,075,000
1909	1,179,858,000	190,930,000	1,370,788,000
1910	1,450,821,000	168,184,000	1,619,005,000
1911	1,597,629,000	158,441,000	1,756,070,000
1912	1,965,659,000	191,396,000	2,157,055,000
1913	1,708,186,000	136,944,000	1,845,130,000

*Revised. Include 1,000,473 pounds in 1900 and 6,555,855 pounds in 1904 of "other sheet iron and sheet steel, tin or terne plated."

CONSUMPTION OF TIN PLATES AND TERNE PLATES

The following table gives the approximate annual consumption of tin plates and terne plates from 1907 to 1913:

Calendar years, gross tons	Production	Add imports	Deduct exports	Approximate consumption
1907	514,775	57,773	10,203	562,345
1908	537,087	58,490	11,878	583,699
1909	611,959	62,593	9,327	665,225
1910	722,770	66,640	12,445	776,965
1911	783,960	14,099	61,381	736,678
1912	962,971	2,052	81,694	883,329
1913	823,719	20,680	57,812	786,587

In 1911 our production of tin plates and terne plates first exceeded our consumption, the difference amounting to 47,282 tons. In 1912 the production exceeded consumption by 79,642 tons and in 1913 by 37,132 tons.

Of the exports of 129,499,303 lb. of tin and terne plates in 1913, Canada took 100,346,247 lb. In 1912 Canada took 105,492,978 lb. out of total exports of 182,994,919 lb. China took 13,166,000 lb. in 1912, against only 1,928,000 lb. last year, and British India 8,737,493 lb. in 1912, against only 62,591 lb. last year.

Ryerson Warehouse at St. Louis

Joseph T. Ryerson & Son, whose Chicago iron and steel warehouses have contributed largely to the importance of that city as a distributing center for iron and steel and boiler makers' specialties from stock, announce the establishment of warehouses at St. Louis. Immediate service is to be given in all of the lines which this company carries at Chicago. This has been made possible by the taking over of the plant, merchandise, equipment and good will of the W. G. Hagar Iron Company, around which nucleus complete Ryerson stock and facilities are to be built. The outfit taken over is to be supplemented by additional building space and equipment for the handling and cutting of material. The St. Louis market has been known as an especially active jobbing center with distinctive characteristics, and to all of the local requirements the new Ryerson warehouses and service are to be especially adapted.

Benzol Recovery Plant at Farrell

Bagley, Mills & Co., 50 Church street, New York, American representatives of Carl Still, Recklinghausen, Germany, will shortly begin work, under a contract just received from the Carnegie Steel Company, on the construction of a benzol recovery plant at Farrell, Pa., adjoining the by-product coke plant now operated there. This marks the introduction of benzol recovery in this country at by-product coke works. The Carl Still type of benzol recovery and refining plant has been quite generally adopted in Europe, installations having been made by the German Government Mines Department and the Krupp Works, and in Great Britain by Bolckow, Vaughan & Co., the Workington Iron & Steel Company and other companies.

The Machinery Markets

Actual improvement, or at least encouraging symptoms, are evident in a majority of the important machinery distributing centers, although in one or two places equally as important there has been no change. In the New York territory a couple of good orders have been placed, others are pending and the small lot business is larger in volume. In New England a slight improvement has set in and numerous inquiries indicate a good run of orders when general business improves. In Detroit second-hand equipment is moving more freely and more inquiries are coming out, but most of these are tentative and the market remains quiet. Good orders for cranes are being received in Cleveland, but other lines are as quiet as they have been in recent weeks. Cincinnati has felt a little increase in the export trade, though machine tool establishments as a rule are operating at only 35 per cent. of capacity. In the Central South there is a fair degree of activity in and near Louisville. Milwaukee reports a gradual improvement and machine tool dealers believe that the end of the slump is near at hand. Buying is somewhat better in St. Louis, but much of the inquiry coming out is still of a tentative character. Purchasing has been a little more liberal in Birmingham. Texas is looking forward to a stimulation of business in that State when Mexican affairs are adjusted; meanwhile business is holding up well, considering the season. The San Francisco machinery trade continues quiet, but some of the larger shops are doing preliminary figuring on contemplated improvements. In the Pacific Northwest business is being helped along by activity in harvesting and in the lumber mills.

New York

NEW YORK, July 22, 1914.

Indications of an improvement in the demand for machinery have been coming to light in the past few days. These consisted not only of inquiries, but of actual orders, two or three of which were attractive in size, although the majority were of the small and scattered variety which have been so common of late. A substantial order for machine tools was placed with a New York house by the Pierce-Arrow Motor Car Company, Buffalo, N. Y. Bids on the revised list of the Seaboard Air Line were all in yesterday and there should be some action soon with this long deferred business. An Eastern railroad has placed an order even better than that of the Pierce Arrow Motor Car Company, but none of the parties concerned are willing to give any details of the transaction. Other railroads have come out with various requirements, mostly for one or a few special shop tools. The Central High School and the Boys' Industrial School, Newark, N. J., is in the market for four lathes, a milling machine and a grinder. The propositions mentioned, together with a number of others involving one or two machines, have encouraged the trade to believe that better times are in sight. Already, with at least one important dealer, this month is ahead of last month in the same period of time, and collections are reported as good. Dealers in second-hand machinery are industrially picking up bargains wherever they can to be ready for the demand which they confidently expect will come this fall, and perhaps sooner.

The Funk Blower Company, 243 Washington street, Jersey City, N. J., manufacturer of pressure blowers, is having its products manufactured under contract for the present, but later will establish its own factory. A. C. Reeves is president.

Bids are being received this week by E. C. Rider, superintendent of the Northern New York Institution for Deaf Mutes, Malone, N. Y., for electric generating equipment required for the institution.

The Interior Metal Mfg. Company, Jamestown, N. Y., will soon let contracts for a steel concrete and brick addition to its plant on River street to cost with equipment $40,000. The new building will increase the floor space and capacity of the factory 50 per cent.

The Lisk Mfg. Company, Canandaigua, N. Y., maker of enamelware, has plans contemplated for an addition to its factory, 100 x 200 ft., one story, of reinforced concrete.

The Buffalo Scale Company, Buffalo, which recently sold its plant on Scott street to the Lehigh Valley Railroad for a new terminal freight house, has leased 50,000 sq. ft. of floor space in the Thomas Power Buildings, Niagara and West Ferry streets and the New York Central Railroad Belt Line.

The Electric City Glass Company, Inc., Buffalo, has filed articles of incorporation with a capital stock of $35,000 to engage in the general manufacture of glass and glassware. The incorporators are C. F. Wagner, O. F. Tresch and A. Tresch. It has established a factory at 480 Genesee street.

C. M. Jones, Cutler Building, Rochester, has let the contract for an addition to his factory.

Plans are in progress for the erection of a factory at Belmont, N. Y., 40 x 150 ft., of brick and concrete construction, to be occupied by the Pennsylvania Lock & Hardware Company, Columbia, Pa. A. Haldeman is president. The company will also operate the old Clark foundry at Belmont in connection with its business.

Plans are being completed for the erection of a plant to cost about $35,000 for the newly organized Continental Heating Company, Dunkirk, N. Y., manufacturer of radiators and heating boilers.

Daniel Upton, principal of the Buffalo State Normal School, Jersey and Fourteenth streets, Buffalo, is receiving bids until July 27 for electric motor generator equipment and electrically driven wood working machinery for the new normal school.

The Buffalo Copper & Brass Rolling Mill Company, Buffalo, will erect a chemical laboratory 24 x 140 ft., at its plant, Military road, Denver street and the New York Central Railroad.

E. K. Buttolph, Dunkirk, N. Y., has purchased the plant, machinery and stock of the bankrupt Motor Mfg. Works, East Second street, that city, and will continue the operation of the plant.

The Madrigan Lumber Company, Dunkirk, N. Y., is making additions to its woodworking plant on Marsden street.

The American Agricultural Chemical Company, Buffalo, is building a one-story brick addition, 40 x 100 ft., to its plant at Lewis and Babcock streets and the Erie Railroad.

The report that the plant of the Salamanca Engine-Iron Company, Salamanca, N. Y., was destroyed by fire is false. The only loss by fire was in a quantity of patterns that were ruined. The plant is running at full capacity.

New England

BOSTON, MASS., July 21, 1914.

Without a doubt a slight improvement in general business has set in and the belief is growing that the bottom of the depression has been passed. The machinery trade is feeling the change to a certain degree but not in the way of increased orders. Inquiries based on planned increases of manufacturing facilities, which will be carried out when a period of good business is assured, are numerous. These include many requests for figures on the cost of manufacturing new work, and also new work where the purpose is to reduce expenses of production.

The Premier Electrical Mfg. Company, Bridgeport, Conn., has been organized as a Connecticut corporation to manufacture indicating fuses, fuse blocks and other electrical devices. The company has secured a factory containing about 5000 sq. ft. of floor space and proposes to begin manufacturing soon. Not much new equipment will be required at present. It will consist of the machine tools necessary for the making of punches, dies and fixtures and two or three punch presses, tapping machines, sensitive drilling machines and a few special machines which are being made to order. F. A. North is president; Edward E. Fostrom, vice-president; Walter E. French, secretary, and H. J. French, treasurer.

The addition which the Springfield Foundry Company, Springfield, Mass., is building at its plant in Indian Orchard will be used as a core room and an extension to the shipping department.

The Farrel Foundry & Machine Company, Ansonia, Conn., manufacturer of chilled rolls and heavy machinery, states that the new building now in process of erection will probably be used in the beginning chiefly as a store house. However, the intention is, when business becomes good again, to utilize this new space for manufacturing as the need of increased facilities is felt.

The Waltham Machine Works, Waltham, Mass., manufacturer of watch and clock machinery, small automatic machines, machinists' bench lathes, etc., are making large additions to their plant. An extension at the one end of the present factory will be 26 x 33 ft., one-story and basement, and the other end will receive an addition 26 ft. sq., which will combine to make the machine department 122 ft. long. A head building will be 28 x 28 ft., two stories and basement, and will contain the office, drafting room, storage for patterns and finished machines, etc. As to new machine tool equipment, some has already been purchased and no decision has been reached as to the remainder, the amount of which will depend wholly on the condition of business when the building is completed. The capacity of the plant will be increased from 25 to 30 per cent.

C. J. Bates & Son, Chester, Conn., manufacturers of hardware, will erect a two-story addition, 20 x 30 ft., and a one-story forge shop, 25 x 25 ft. The company is now manufacturing a portion of its product in Newark, N. J., and this part of the business will be moved to Chester as soon as the buildings are completed.

The Birmingham Iron Foundry, Derby, Conn., manufacturer of rolls, rubber mill machinery and general heavy machinery and castings, has started work on an extension of its machine shop, 90 x 160 ft., of steel and brick construction. The addition will have a traveling crane, and will be used chiefly as an erecting department, so that not much new equipment will be required, and for this contracts have been placed. The company states that business is poor; the new space is being created at this time partly because building materials are low and partly in anticipation of future needs. The structure will stand on an acre of land recently purchased adjoining the plant.

The Lux Model Works, Waterbury, Conn., manufacturer of spring motors, special clock movements, etc., has been incorporated as the Lux Clock Company, under a Connecticut charter. Paul Lux is president and Fred Lux, manager.

The new factory of the A. H. Wells Company, Waterbury, Conn., will be used for manufacturing purposes, extending the firm's facilities for producing copper and brass tubing.

The business of the T. R. Almond Mfg. Company, Ashburnham, Mass., manufacturer of chucks, has been taken over by the Almond Company, a Massachusetts corporation, having an authorized capital of $950,000. The incorporators are C. A. Hubbell and H. S. Hubbell. The purpose of the change is to provide new capital with which to extend the present line of products. However, there is no intention of increasing manufacturing facilities for the present.

The new building which will be erected by the Union Hardware Company, Torrington, Conn., will be used as a hardening shop, and will be equipped with furnaces and the other equipment and tools necessary for the work.

The Commonwealth Engineering Company, Inc., 113 Munroe street, Lynn, Mass., has been organized with the purpose of designing and manufacturing machinery of all kinds. It is not the intention to erect a plant at present because of the condition of general business. Instead contracts to do work with several factories have been made. Earl Abrams is the president; E. S. Hannum, treasurer, and John B. Cahoon, clerk.

The building which the Plume & Atwood Mfg. Company, Waterbury, Conn., has in process of construction, will be used for manufacturing purposes, the company states. The structure will be 47 x 170 ft. and five stories.

Philadelphia

PHILADELPHIA, PA., July 20, 1914.

The Pennsylvania Equipment Company, West End Trust Building, Philadelphia, is in the market for a second-hand, 8-wheel locomotive crane of 15 to 20-ton capacity.

A Pennsylvania charter has been granted to the Euston Process Company, Scranton, Pa., with a capital stock of $200,000, to manufacture lead into white lead. The incorporators are S. Edwin Euston, Henry Belin, Jr., and Charles H. Welles, Jr., all of Scranton.

The Bristol Machine & Locomotive Works, Bristol, Va., desires prices on an 18 or 20-in. drill press and an air compressor 10 x 12 in. C. H. Rhodes is general manager.

Samuel T. Williams, 223 North Calvert street, Baltimore, Md., is in the market for a second-hand single-drum, double-cylinder hoisting engine, 15 to 20-hp. capacity, without boiler.

The Rochester Clay Products Company, Rochester, Pa., has been incorporated with a capital stock of $25,000 by J. A. Miller, K. L. Miller and J. E. Snyder. It has purchased the plant of the Miller Brick Company and will manufacture face building brick.

The Cameron Engineering Company, East Stroudsburg, Pa., has been incorporated and will manufacture patented mono-rail systems, weighing devices, portable cranes, transfer trucks, etc. It has secured factory space for the present, but will later build a plant. All the business and good will of the Cameron Engineering Company, Washington, N. J., have been bought by the new company. L. Ruprecht is president and G. S. Pullinger, secretary.

Chicago

CHICAGO, ILL., July 20, 1914.

In the machinery trade some broadening of the inquiry has begun to be noted. The business in sight is still of a miscellaneous character with a sprinkling of railroad inquiry but the aggregate has grown somewhat in proportions. The $5,000,000 plant of Crane Company at Chicago, contracts for a third section of which were recently let, has now progressed to a point where consideration will have to be given to the matter of equipment. The agricultural implement manufacturers who in normal times are continuously in the market for some equipment are again approaching their season of manufacture and reports indicate that their activity for many months at a minimum is now increasing.

The American Pattern & Model Company, North Hoyne avenue, Chicago, has had plans prepared for a two-story addition, 60 x 124 ft., to its present factory.

The Steam Power Devices Company and the Motor Engineering Company, Chicago, have consolidated to form the Winslow Safety High Pressure Boiler Company. The Motor Engineering Company capital stock was increased from $10,000 to $50,000; the Steam Power Devices Company capital stock was increased from $6,000 to $50,000.

The Duffin Iron Company, Chicago, has been incorporated with a capital stock of $25,000 by A. W. Westergreen, Harry Weig and Albert L. Quist, 1540 Winona avenue. It will deal in iron, steel and metal products.

The contract for the $45,000 power plant to be built at Urbana University, Urbana, Ill., has been awarded to Freeman & Brooks, Champaign, Ill. The equipment includes two 500 hp. Babcock & Wilcox water tube boilers fitted with Green stokers.

Progressive Engineering Company, Peoria, Ill., has been organized with a capital stock of $150,000 to conduct a general mining, manufacturing and engineering business. The incorporators are Clayton J. Ewing, George H. Beatty, Cagill V. Gerth. McRoberts, Morgan & Zimmermann, 319 Main street, Peoria, Ill., are attorneys for the company.

The Liggett & Pratt Bed Spring Company, Carthage, Mo., will open a plant at Waukegan, Ill., about August 1.

Fire at the roundhouse of the Chicago & Eastern Illinois Railroad, at Thebes, Ill., caused an estimated loss of about $3000.

The Universal Crushed Stone Company, Racine and Ives, Wis., has increased its capital stock from $130,000 to $215,000 and plans to install additional electrical hoisting, tramway and crushing equipment.

The Sioux Falls Construction Company, Sioux Falls, S. D., has a general contract for a structure 66 x 150 ft., two stories, brick and reinforced concrete construction, to cost $50,000.

The Northwestern Knitting Company, Minneapolis, Minn., has taken out a permit for an eight-story brick and concrete addition to their factory, to cost $100,000.

The Electrolytic Gas Company, Dayton, Ohio, has purchased property and will build a plant at Portland, Ore.

The Kenosha Boiler & Structural Company, Kenosha, Wis., has been incorporated with a capital stock of $10,000 by Frank G. Erickson, W. G. Bloxdorf, A. H. Klueudor and Geo. W. Taylor.

The Lake Superior Iron & Chemical Company, Ashland, Wis., has plans ready for rebuilding its primary house which was destroyed by fire last spring and as soon as the contract is let the rebuilding will begin.

The Topaz Silo & Mfg. Company, Des Moines, Ia., has secured a site at Aberdeen, S. D., and will start work soon on a factory branch. This company is a subsidiary of the International Silo Company.

The Middle West Automobile Corporation, Joliet, Ill., has been incorporated with a capital stock of $16,000 by William H. Oliver, Erle R. Merrill and August Beltzner and will equip a repair plant.

The Lee County Central Electric Company, Amboy, Ill., has been incorporated with a capital stock of $250,000 by S. L. Shaw, E. L. King, H. W. Hillison, A. H. Nichols and others to equip an electric line, including power plant, etc.

A coal chute of the Chicago & Alton Railway, at Venice, Ill., was destroyed by fire July 15, including mechanical loading apparatus, etc. It will be replaced.

The Eldorado Stove Company, Eldorado, Ill., has been incorporated with a capital stock of $12,500 by Smith Gibson, R. R. Caraway, B. R. Jenkins and others to manufacture stoves.

The Iliff-Bruff Chemical Company, Hoopeston, Ill., has been incorporated with a capital stock of $150,000 by E. Iliff, C. M. Bruff and D. K. Lindhout.

The Forest City Wire Works, Rockford, Ill., has increased its capital stock from $5000 to $25,000 for the purpose of adding to plant equipment.

The Agnew Farmers' Elevator Company, Agnew, Ill., has been incorporated with a capital stock of $15,000 by C. T. Matznick, W. C. McCue, W. T. Stern and others and will build a grain elevator.

Catalogues Wanted

The Orton & Steinbrenner Company, 608 South Dearborn street, Chicago, manufacturer of handling machinery, will be pleased to receive catalogues from manufacturers of quick-acting flanging clamps.

Milwaukee

MILWAUKEE, WIS., July 20, 1914.

Gradual improvement is to be noted in several lines, particularly machine tools, and general reports are becoming more optimistic each week. The agricultural implement and machinery field is forging to the front rapidly and several large Milwaukee interests are adding more men and coming closer to the maximum capacity of their existing works. In preparation for the bumper crop business the main shops of the Chicago, Milwaukee & St. Paul at Milwaukee are adding 400 to 600 men and increasing hours of work. Collections show considerable improvement. The general opinion among manufacturers is that the slump is not entirely over, but that there is every reason to believe that it will be very shortly.

The Federal Rubber Mfg. Company, Cudahy, has broken ground for additional buildings affording 150,000 sq. ft. of floor space and increasing the total space to 450,000 sq. ft. Some additional steam power units will be added, together with a large assortment of special tire and commercial rubber goods machinery. Byron C. Dowse is president.

J. W. Radke, 4409 Lisbon avenue, Milwaukee, is building a public garage and repair shop and will need a small list of hand and power tools.

The Marathon Electric Mfg. Company, of Wausau, Wis., which has been organized, as previously reported, to manufacture alternating current and direct current motors from 1/100 to 5 hp., has purchased a factory which is now being equipped. Justin Lebovici is in charge of operations and design. E. M. Bishoff is manager.

The John Hoberg Company, Green Bay, Wis., operating paper and tissue mills, will erect a three-story addition, 40 x 180 ft., to be used for the finishing department. The improvements will cost about $65,000. Frank H. Hoberg is president and general manager.

The Faultless Starter Company, Racine, Wis., organized to manufacture a cranking device for automobile engines, has discontinued business and dissolved as a corporation. The promoters were unable to muster sufficient financial backing.

The Haney-Gasper-White Company, Algoma, Wis., operating a large garage, is building an addition to be devoted to automobile repair and general machine shop purposes. The concern intends to handle commercial machine work in addition to motor car repairs. A small list of power-driven tools will be purchased at once.

The Joseph F. Rothe Foundry Company, Green Bay, Wis., which was incorporated recently with $50,000 capital to take over the business of Joseph F. Rothe, does not intend to make any additions, Mr. Rothe having erected a modern foundry and machine shop on Webster avenue two years ago. The incorporation of the business is for convenience and to make possible a considerable expansion of territory and trade. Mr. Rothe is president and general manager.

The board of education, Beloit, Wis., has decided to add a course in metal-working and blacksmithing and will erect a brick addition to the high school, to be equipped with forges, lathes and other power-driven tool and shop equipment. The addition will be 39 x 44 ft., with 15-ft. walls.

A new high school building, to cost about $90,000, will be erected at Sparta, Wis. Provision will be made for a manual training department.

Indianapolis

INDIANAPOLIS, IND., July 20, 1914.

The Electric & Steam Railway Supply Company, Lafayette, Ind., has dissolved.

The Richmond Water Softener Company, Richmond, Ind., has been incorporated with $10,000 capital stock to manufacture water softeners and other devices. The directors are E. W. McGuire, M. C. Henley and W. G. Butler.

The Butler Utilities Company, Butler, Ind., has been incorporated with $25,000 capital stock to supply water and electricity. The directors are E. A. Geaque, C. M. Lott and W. F. Shumaker.

The C. A. Shult Mfg. Company, Monticello, Ind., has been incorporated with $225,000 capital stock to manufacture milling and grain cleaning machinery. The directors are C. P. Ritter, R. D. Cass and M. N. Simon.

The Albany Paper Products Company, Albany, Ind., recently organized with $450,000 capital stock, has purchased the Albany Paper Company's plant at Albany, Ind., and proposes to enlarge it and convert it into a modern paper mill. Charles Austin is president.

The McEntee Plow Company, Tipton, Ind., manufacturer of plow points, will begin the erection of a factory as soon as the plans are completed.

The Goshen Stamping & Brass Company, Goshen, Ind., has been incorporated with $15,000 capital stock to manufacture electrical heating devices. The directors are A. F. Ernest, Herman Schmidt and C. B. Miller.

Detroit

DETROIT, MICH., July 20, 1914.

The machinery market is still quiet and conditions seem unchanged. Sales are confined to single pieces of equipment and the number of transactions were not encouraging. Inquiries show an improvement in mere point of number but a large proportion of them are tentative and are not expected to result in sales at an early date. Second-hand equipment is moving rather more freely. A decline in the demand for electrical equipment is reported. No improvement in the general industrial condition is apparent. A great many plants are running on part time, both in metal working lines and other trades. The general dullness is beginning to be felt in the building trade, where new construction work is showing a slow but steady decrease.

The Holihan Mfg. Company, Detroit, has acquired a new factory at Jefferson avenue and Twenty-third street, 80 x 120 ft., which will greatly increase its capacity. The company, which manufactures all kinds of sheet metal stampings, is installing additional enameling ovens and considerable new equipment.

The Detroit Insulated Wire Company, Detroit, has been reorganized following a receivership, and the following officers elected: Joseph H. Hunter, president; J. G. Splane, vice-president, and C. C. Gray, secretary and treasurer. No change will be made in the company's manufacturing operations.

The Detroit Air Pump Company, Detroit, has been incorporated with $100,000 capital stock to manufacture compressed air pumps and other air devices. The incorporators are A. F. S. Blackwood, David H. Barnett and Emanuel T. Berger.

Shock absorbers and automobile locks will be manufactured by the Pneumatic Spring & Lock Company, Detroit, which has just been incorporated by Ellsworth S. Bryant, George R. Conts and Otto F. Beier. The new company is capitalized at $150,000.

The Michigan Brass Foundry Company, Detroit, has completed negotiations for the removal of its business to Battle Creek, Mich., where a new factory has been acquired. The company is capitalized at $30,000.

The plant of the Musical Instrument Company, Boyne City, Mich., was destroyed by fire June 10, entailing a loss of $50,000. Automatic musical instruments are manufactured by the company, which plans to rebuild its factory immediately.

To provide for increasing business the Michigan Washing Machine Company, Muskegon Heights, Mich., will build a one-story addition to its plant. A new boiler and engine will be installed.

The Baked Clay Company, Grand Ledge, Mich., has been organized with $150,000 capital stock to manufacture clay products. The officers are E. H. Baker, D. D. Shane and J. D. Summers.

The Lewis Mfg. Company, Bay City, Mich., manufacturer of interior finish, has increased its capital stock from $50,000 to $100,000.

The Lake Superior Iron & Chemical Company, Frank W. Blair, receiver, Detroit, Mich., whose distilling works, at Ashland, Mich., were destroyed by fire last April, will rebuild with double the previous capacity. George E. Webster is general manager.

The Michigan Brass & Foundry Company, capitalized at $30,000, will locate at Battle Creek, Mich. The company manufactures brass specials, valves and gas cocks.

Cleveland

CLEVELAND, OHIO, July 20, 1914.

Conditions in the machinery market remain about as they have been for several weeks past. Both orders and inquiries are very light. Some fairly good business is in prospect, but is being held up. Little improvement is expected in the demand before fall. The demand for cranes is fairly good, having improved somewhat. In general manufacturing lines a few plants report a slightly better volume of orders, but with few exceptions operating activities have not been increased.

The Cleveland Metal Products Company, Cleveland, Ohio, announces that the large extensions that are being made to its plant will be used for the casting, rolling and fabrication of aluminum. The company at present has a large steel stamping and porcelain enameling plant, the latter being 160 x 252 ft. In addition to this it has a factory building 62 x 170 ft., five stories. An addition 100 x 266 ft. is being made to the latter building and this extension will be used for the manufacture of aluminum cooking utensils. A castings building 57 x 83 ft. and a rolling mill building 82 x 100 ft. are under construction to provide sheets and castings for cooking utensils. In addition to these utensils aluminum sheets and castings will be placed on the market.

Sealed proposals for various mechanical and other equipment in connection with the new city hall in Cleveland will be received by the commissioner of purchases and supplies, August 18. Among the items listed are the heating and ventilating, motor generator sets, elevators, vacuum cleaning, pneumatic tube service, ornamental iron and bronze work and plumbing. Bids for transformers for the municipal lighting plant will be received July 31.

The Cleveland Railway Company has placed an order with the G. S. Kuhlman Car Company, Cleveland, for 100 center entrance motor street cars.

The Union Metal Mfg. Company, Canton, Ohio, maker of ornamental metal posts and other products, will shortly begin the erection of a two-story brick addition 70 x 250 ft.

The Belmont Stamping & Enameling Company, New Philadelphia, Ohio, maker of enameled kitchen ware, will enlarge its plant by the erection of a brick, steel and concrete addition 192 x 211 ft. to be used for enameling purposes and as a warehouse.

The Boerder Steel Company, Toledo, Ohio, has purchased from L. H. Lavan, Cleveland, the Wilkes Foundry on Woodville street, Toledo, and will place it in operation shortly for the manufacture of steel castings. The plant has been idle for about three years. It will be under the management of Anton Boerder, formerly of Charleston, W. Va.

The Glen Churn Company, Findlay, Ohio, has been incorporated with a capital stock of $50,000 by Edward Van Steenburg to manufacture churns.

The W. J. Clark Company, Salem, Ohio, has purchased the Woodruff stove plant in that city and will occupy it as soon as equipment is installed. The plant of the Clark Company was recently burned and it decided to buy the Woodruff plant, which has been idle for several years, rather than rebuild.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, will shortly begin the erection of a new plant.

The Marathon Tire & Rubber Company, Cuyahoga Falls, Ohio, has increased its capitalization from $100,000 to $500,000 and will enlarge its plant.

The town of Wapakoneta, Ohio, will receive bids shortly for a 250-hp. steam boiler.

The Buckeye Machine Company, Lima, Ohio, maker of gas engines, plans the erection of a 60 x 150 ft. building and several smaller structures on a three-acre site recently secured at Atlantic avenue and the Erie Railroad right of way.

The Delaware Foundry & Machine Company, Delaware, Ohio, has been incorporated with a capital stock of $25,000 and will build a foundry as soon as a site is selected. The company has effected an organization by the election of C. C. Stedman, president; F. M. Bauereis, vice-president; Robert Greer, secretary and general manager, and H. M. Bing, treasurer.

Cincinnati

CINCINNATI, OHIO, July 20, 1914.

Reports from machine tool builders show that the principal encouraging feature of the present situation is a slight increase in the export trade. There are also rumors that the railroads are doing some quiet figuring on different kinds of equipment and supplies that will benefit manufacturers in this section. However, a careful canvass of the plants in this vicinity will show the machine tool establishments as operating to only about 35 per cent. of capacity, and this same average will also apply to the jobbing foundries. The dealers in machine tools and second-hand machinery report no change in the situation, and with nothing tangible in sight to warrant a prediction of normal business conditions at an early date. The final settlement of the freight rate question, while disappointing to most manufacturers, as well as the railroads, is welcomed by all. It is generally believed that the uncertainty about this decision has held back railroad buying more than the trade realizes.

Electrical equipment, both large and small units, seems to be holding its own fairly well. One leading local manufacturer is able to operate on full time, although its force has been reduced below the average number of men employed at this time last year. Manufacturers of engineering supplies and specialties report some improvement, but the total business for the first six months of the year is considerably below last year's record for the same period.

The Cincinnati Iron & Steel Company, Cincinnati, has had plans prepared for an addition to its warehouse at Carr and Sargeant streets.

Bids will be opened August 7 for two boilers, one air compressor, two engines and generators and other power plant equipment to be installed in the waterworks and lighting plant of the city of Norwood, Ohio. Walter G. Franz, Union Trust Building, Cincinnati, is consulting engineer.

The Queen & Crescent Railroad Company has acquired a large site adjoining its property in Ludlow, Ky., near Cincinnati, and in addition to enlarging its yards it will add a large building to its repair shops. No plans have yet been worked out.

The Portsmouth Steel Company, Portsmouth, Ohio, is installing a 4000-hp. engine in its power plant. Several smaller engines are also being installed in the sheet mill departments.

The Columbus Brass Company, Columbus, Ohio, will vacate its plant on Fourth street and concentrate all of its business in its building on Dublin avenue, to which additions will be made.

The Harrold Tool Company, Salem, Ohio, will enlarge its plant at an early date.

The Vulcan Carriage Company, Painesville, Ohio, has been incorporated with $1,000,000 capital stock by E. D. Heartwell and others. Nothing is known as to manufacturing plans.

The Xenia Rubber Company, Xenia, Ohio, contemplates building a plant at an early date.

Refrigerating equipment will be required by the Chamberlain Ice Cream Company, Lafayette, Ind., for installation in a three-story brick building to be erected adjoining its present plant.

The Central South

LOUISVILLE, KY., July 20, 1914.

A fair degree of activity continues in the trade locally, especially in the way of increased operations in the mining territory, extension of railroads into the eastern Kentucky field, especially, and here and there improvements in electric generating plants. Requirements for buildings in Louisville have not been all supplied and agricultural requirements have increased. This section is more agricultural than industrial and therefore recent soaking rains have brought renewed cheer to the trade.

Operations have begun at Lexington, Ky., on what will be a million dollar improvement there for the Louisville & Nashville Railroad. Contracts for the grading only have been let; but according to best information obtainable, the improvements will include a machine shop, mechanical department, an electric turntable and a 700-ton capacity automatic steel coal chute.

The McEntee Plow Company, Tipton, Ind., has been incorporated to erect and equip a factory to manufacture plow points.

Electric power will be used in operating a mill in process of construction at Knoxville, Tenn., to cut marble. S. A. Rogers is president of the company.

It is understood that extensive improvements will be made in the plant of the Danville Gas Light Company, Danville, Ky., which has passed into the hands of the Commonwealth Power, Railway & Light Company. The transfer was made through the Fidelity & Columbia Trust Company, Louisville.

New equipment will be needed by the Fox Brothers Company, a branch of the Peter Fox Sons Company, Chicago, in rebuilding the refrigerating plant recently destroyed by fire at Hopkinsville, Ky., at an estimated loss of $40,000.

Lee Hughes has purchased a 300-acre timber tract near Scottsville, Ky., for a Nashville company. A mill will be erected to saw the timber.

Two mills are under construction at Knoxville, Tenn., for the Appalachian Mills, manufacturers of underwear. Machinery to cost $100,000 will be installed.

The Ft. Wayne & Northern Indiana Traction Company has announced that it will construct an extensive repair shop near Lafayette, Ind.

Birmingham

BIRMINGHAM, ALA., July 20, 1914.

The machinery trade still lags. There is a disposition for larger buying as soon as business generally improves. Large structural operations in the Birmingham district cause much buying of machine tools and there is a steady demand from farms for gasoline engines. The agricultural end holds up well. Big engines and boilers are not selling.

Swift & Co., Chicago, Ill., have plans for their $300,000 factory to be erected at Augusta, Ga. The oil mill is to have six presses for crushing 18,000 tons of cotton seed annually. The fertilizer factory will be in a separate building. Electric power will be supplied by a 500-hp. generator.

Dixie Pipe Company, Gadsden, Ala., has been organized and proposes to build a sixteen-floor soil pipe works. Robert Campbell and others are interested.

D. W. Day, Hartselle, Ala., proposes to construct a hydro-electric plant at Fall City, Ala., to develop 500 hp. primarily with 2000 hp. available.

J. P. Wood will build a sawmill plant near Troy, Ala.

Plans are being prepared for rebuilding the recently burned plant of the A. J. Spencer Lumber Company, Troy, Ala.

The Alto Face Brick Company, Rome, Ga., has been incorporated with a capital stock of $30,000 to manufacture brick and other building materials. J. H. B. Morrison, C. T. Trammell, and others, are interested.

The Panola Light & Power Company, Conyers, Ga., will add 500 hp. to its electric plant.

Texas

AUSTIN, TEXAS, July 18, 1914.

An increased demand for small tools is reported. Machinery sales also hold up well, considering that this is the dull season. Everything points to an unprecedented large volume of machinery and tool trade in Texas and throughout the Southwest this fall. The improved condition of affairs in Mexico is gratifying to American machinery and tool manufacturers who are looking to that field for a large trade in their respective lines as soon as permanent peace is assured.

The Gulf Menhaden Company, Houston, is arranging to construct a factory at Aransas Pass for converting fish into fertilizer and oil. The plant will cost about $75,000. Bertram D. Lackey is president.

Mrs. J. Bedell Moore, San Antonio, is having surveys made for an extensive system of irrigation that will require considerable pumping equipment.

The Collin County Mill & Elevator Company, McKinney, has increased its capital stock from $100,000 to $200,000 and will make improvements to its flour mill.

The Abilene Press Brick Company, Abilene, which has a capital stock of $15,000, will construct a brick factory. The incorporators are E. B. Bynum, Oscar Parker and J. W. Fulwiler.

The Sedgwick Paint Company, Ft. Worth, which has been organized with a capital stock of $10,000, will construct a paint factory. C. T. Sedgwick is interested.

St. Louis

ST. LOUIS, Mo., July 20, 1914.

A latent buying movement here awaits a stimulus to put it in motion. Inquiries which are being received by the machine tool dealers give no definite opening for a transaction. Dealers report the receipt of very many letters asking what could be done under certain specified circumstances and the aggregate of business which, apparently, is dependent upon the turn for the better is undoubtedly quite large. As it is, though, dealers can only answer the letters as received and await the arrival of the definite inquiry which all of them feel sure is to come. The actual transactions that are taking place are an improvement from the comparative standpoint, but the aggregate is still very light. Some inquiry is made for second-hand tools, but not in any notable proportion.

The Simplex Shoe Machinery Company, St. Louis, Mo., has been incorporated with a capital stock of $150,000 to do a general shoe machinery business. The incorporators are W. G. Battle, C. E. Clark, T. W. Fuqua, Fred W. Peters and Eugene S. Wilson.

The Automatic Machine Mfg. Company, of South Dakota, has been authorized to use $110,000 of its $250,000 capital in a plant and otherwise at Kansas City, Mo.

The Shomescope Mfg. Company, Kansas City, Mo., has been incorporated with a capital stock of $25,000 by W. E. Gliessner, M. D. Good and E. J. Way, and will engage in manufacturing a patented device.

The Faultless Engine Company, Kansas City, Mo., has increased its capital stock from $12,000 to $50,000 for the purpose of extending its operations and equipment.

The Eagle Scale & Mfg. Company, Harrisonville, Mo., has been incorporated with a capital stock of $25,000, an increase from $5000, for the purpose of adding to its manufacturing operations.

The Campbell Paint & Glass Company, Kansas City, Mo., has increased its capital stock from $250,000 to $350,000 for the purpose of increasing its manufacturing facilities.

The Delta Land & Timber Company, Kansas City, Mo., of which I. H. Fetty is president, has decided to build at Conroe, Tex., its big mills originally intended for Houston, Tex. A double band mill is to be erected and equipped at once, kiln equipment, overhead trolley system, etc. It plans to be ready for operation by January 1 next.

C. A. Martin and T. D. Parr will install an electric light and power plant at Hamilton, Mo.

The Newburg Light & Power Company, Newburg, Mo., of which R. D. Pinto is president, is reported in the market for a new engine and a new generator.

Albert Emmerick and Joseph Breitenbach, Salisbury, Mo., have plans for the immediate equipment of an ice manufacturing plant.

The Dazey Churn Company, St. Louis, Mo., 4305 Warne avenue, will equip an addition to its manufacturing plant requiring about $5000 of machinery.

The Missouri Callophone Company, St. Louis, Mo., has been incorporated with a capital stock of $75,000 by K. A. Krause, C. C. Shafer and J. N. Hull, Jr.

The city of Rockport, Mo., will expend about $12,000 increasing the capacity of its waterworks plant. John T. Wells, city clerk, should be addressed.

The Ashdown Light & Power Company, Ashdown, Ark., will install an electric plant at once.

A franchise for the operation of an electric plant at Mena, Ark., has been granted to the Century Engineering & Construction Company, of which George B. Thayer is president. P. O. Benson is the engineer.

The Blytheville Ice Company, Blytheville, Ark., will rebuild its ice manufacturing plant, doubling its present capacity of 21 tons per day.

The Central Heating & Mfg. Company, Little Rock, Ark., will extend its plant and change from steam to hot water, at an estimated cost of $205,000.

The Argenta Shingle Creosoting Company, Argenta, Ark., of which E. O. Manees is president, will install equipment with a capacity of handling 250,000 shingles daily. J. G. Paty is in charge.

The E. T. Peck Cooperage Company, Bentonville, Ark., will equip a plant for the manufacture of 500 barrels per day of slack cooperage.

A finishing plant to cost about $40,000 will be established at Kensett, Ark., by the Chess & Wymond Stave Company, Louisville, Ky.

The Dixie Canner Company, Little Rock, Ark., is in the market for ice machinery with a capacity of six tons per day.

The Fairland Light & Power Company, Fairland, Okla.,

is in the market for generating equipment, with exciter, 50-hp. engine, 60-hp. boiler, etc. L. D. Long should be addressed.

The city of Billings, Okla., will expend $23,000 on a waterworks plant. The mayor should be addressed.

The Washita Electric Power Company, Pauls Valley, Okla., of which R. K. Johnston is secretary, has plans for the installation of an ice plant.

The city of Mangum, Okla., will expend $100,000 on an electric light plant. The mayor should be addressed.

The People's Ice Company, Biloxi, Miss., in which A. Kornmann, Jr., and others, are interested, has plans for the equipment of an ice plant of 50 tons daily capacity.

L. S. Rogers and others, West, Miss., have plans for the installation of an ice manufacturing plant, etc.

A lumber mill is to be equipped by Conn Brothers, Hattiesburg, Miss.

Bids will be received by the city of Belzoni, Miss., until August 4 for the equipment of a motor driven sewage pumping plant in connection with its new sewer system. Mayor W. S. Knotts should be addressed.

An electric railway with power plant, etc., is to be equipped from Lockport to Donaldsonville, La. L. P. Caillouet and H. S. Smith, Thibodaux, and Walter Ohlmeyer, Plattenville, La., will build a power plant.

The Peavey Byrnes Company, Shreveport, La., will install equipment at once for the manufacture of a patented silo.

San Francisco

SAN FRANCISCO, CAL., July 14, 1914.

The machinery trade continues quiet, with perhaps a slight curtailment due to the midsummer season. There is still some demand for implements and agricultural machinery, and several mining districts are doing better than usual, but other lines receive little attention, machine tools being particularly dull. The larger shops have been doing considerable preliminary figuring, but are unwilling to place any orders at present and salesmen are devoting themselves to the small trade, with only mediocre results. Those who have been through the country report little business, but find ground for enthusiasm in the crops, which they believe cannot fail to react favorably before long. Considerable prospective business will no doubt be delayed until after the fall election, as several initiative measures are to come up in the Pacific states which would have a serious effect on industrial conditions.

The Pacific Gold Dredging Company is preparing to build a dredge on Butte Creek, near Chico, Cal. It will be of the Bucyrus type, with 6-ft. buckets, with a capacity of 125,000 cu. yd. per month.

The town of Colton, Cal., is taking figures on a lot of machinery and tools, including five lathes, for a manual training school.

The Visalia Ice Mfg. Company, Visalia, Cal., will shortly install a plant of 20-tons daily capacity.

The Holt Mfg. Company, Stockton, Cal., is adding two corrugated iron buildings to its plant.

The Needles Publishing Company, Needles, Cal., is preparing to install a $10,000 printing plant.

The water department of San Diego, Cal., will shortly call for bids for two 4-stage centrifugal pumps.

The Adams-Campbell Company, 1730 South Los Angeles street, Los Angeles, Cal., has just completed a modern factory and will install additional equipment in shop, foundry and plating plant, for the manufacture of brass goods, sheet metal and wire novelties, for tool and die making and for general machine work.

The Pacific Northwest

SEATTLE, WASH., July 14, 1914.

A small increase in the prices of lumber and shingles has caused a slight improvement in the lumber market, and encourages the mill owners to continue operations. A number of small mills have been opened recently and general conditions seem better. Local dealers report activity in harvesting machinery.

The Standard Lumber Company, of Colfax, Wash., plan immediate improvements to their lumber plant here, at a cost of about $2000. Considerable new machinery will be required.

The application of George W. Holcomb, Portland, Ore., for appropriation of 1500 second ft. of waters of the Clackamas River, has been approved by state engineer Lewis. A plant costing $1,000,000 will be built, with a capacity of 10,225 hp.

The Interstate Power Company, Thompson Falls, Mont., has recently been organized by Edward Donlin, I. E. Keith and Andrew Peterson, with a capital stock of $450,000. It proposes to build three power plants. It is reported that preliminary surveys are being made.

The North Star Iron Works, Southport, Ore., has secured a site on which they plan the erection of a large iron foundry and factory building.

The Oregon Electric Company, Eugene, Ore., will receive water rights from the State of Oregon that will make possible the construction of a $5,000,000 power project at Clear Lake, according to statements made by L. Gilman, the president. The final plans for actual construction work are ready. They include the construction of two power plants which will have a combined capacity of 90,000 hp.

It is definitely announced that the Western Cooperage Company, Portland, Ore., will build its contemplated plant in St. Johns, Ore., instead of Portland, as reported. It will cost about $50,000.

The Pacific Coast Condensed Milk Company, Seattle, Wash., will begin the construction of a $250,000 condensing plant in Oconomowoc, Wis. The daily capacity of the plant will be about 200,000 cans.

Eastern Canada

TORONTO, ONT., July 18, 1914.

The Kawneer Mfg. Company, 1191 Bathurst street, Toronto, will erect a factory at Guelph, Ont., 40 x 500 ft., for the manufacture of art metal mouldings for store fronts, etc.

The Dominion Stove Company, Kingsville, Ont., will erect a plant to cost $12,000. J. C. Pennington, LaBelle Building, Windsor, Ont., is the architect.

The Crucible Metal Company, London, Ont., will erect a factory to cost $50,000.

The Gutta Percha Rubber Company, Toronto, will make additions to its plant.

The T. Ritchie Company, Aylmer, Ont., will erect a saw mill to cost $30,000.

The Ross Rifle Company has purchased 153 acres at St. Sauveur, near Quebec, Que., where it will move its factory.

It has been officially announced by the Procter & Gamble Company, Cincinnati, Ohio, that it will proceed at once with the erection of a factory at Hamilton, Ont., to cost between $200,000 and $300,000. Herbert French is treasurer.

Basil Mager, vice-president of the National Steel Car Company, Hamilton, Ont., announced that large additions will be made to the passenger car department. The company has received large orders for equipment and passenger cars.

The town of Englehart, Ont., will construct a waterworks plant and a sewer system to cost about $40,000. James Sinton is the engineer.

The Electrical Mfg. Company of Canada, Pembroke, Ont., has been granted a bonus of $5000 by the ratepayers; also guaranteed a loan of $50,000 when its plant is in operation. The company will commence the construction of the plant.

The village of St. Pierre, Que., has granted a loan of $50,000 to the Premier Glass Company, Ltd., which is erecting a plant there. O. J. Klein is interested.

The Ford Motor Car Company, Coldbrook, N. B., will make large additions to its factory.

The Dominion Motor Car Company, Ltd., which has leased a site near the Ford Motor Car Company's factory, Coldbrook, N. B., announces that it will commence the construction of its plant at once. P. A. Rockefeller and other New York capitalists are interested in the new company, which is capitalized at $400,000.

The International Safe & Register Company, Ltd., Ft. Erie, Ont., has been incorporated with a capital stock of $100,000 by G. M. Kellogg, A. C. Mackintosh, A. D. Nie, and others, to manufacture fireproof registers, safes, vaults, etc.

The Reliance Moulding Company, Ltd., Kingston, Ont., has been incorporated with a capital stock of $100,000 by F. R. Phillips, W. H. Martin, S. C. Spangenberg, and others, of Toronto, Ont., to manufacture furniture, mouldings, etc.

The Underground Acetylene Company, Ltd., Toronto, has been incorporated with a capital stock of $60,000 by D. R. Leask, F. H. Vanstone, R. A. Stephen, and others, to manufacture lighting, heating, welding and cutting machines and apparatus, etc.

Thomas Firth & Sons, Ltd., has been incorporated with a capital stock of $60,000 to manufacture steel files, saws and other edged tools, etc. It has appointed Alfred Bicknell, Toronto, Ont., to be its attorney.

The Nash Temperature Control, Ltd., Toronto, has been incorporated with a capital stock of $40,000 by William Marshall, G. P. Reid, N. E. Nash, and others, to manufacture steam, gas and electrical specialties and other machines and appliances for the control of steam, etc.

The All Red Feature Company, Ltd., Windsor, Ont., has been incorporated with a capital stock of $50,000 by F. H. Lawrence, W. D. Brock, manager; A. R. Bartlett, and others, to manufacture motion picture films, apparatus, etc.

The Ledcote Company of Canada, Ltd., Amherst, N. S., has been incorporated with a capital stock of $150,000 by C. J. Silliker, H. A. Purdy, F. L. Miln, and others, to engage in the business of electroplating.

The International Freehold Pulp Wood Company, Ltd., New Carlisle, Que., has been incorporated with a capital stock of $50,000 by J. S. Gordon, J. B. S. Mitchell, and others, to build and operate saw mills, etc.

The Canadian Universal Film Company, Ltd., Toronto, has been incorporated with a capital stock of $150,000 by J. S. Lovell, William Bain, Robert Gowans, and others, to manufacture moving picture films, machinery, etc.

The Canadian Climax Container Company, Ltd., Toronto, Ont., has been incorporated with a capital stock of $100,000 by John Callahan, R. J. Gibson, and others, to take over the business, etc., of the Climax Container Company, Ltd., Chicago, Ill., and to manufacture containers from paper, wood, leather, etc.

Western Canada

WINNIPEG, MAN., July 17, 1914.

The Moose Jaw Abattoir, Moose Jaw, Sask., has been incorporated and will erect a plant to cost $100,000.

W. R. Pickup, of W. R. Pickup & Co., Ltd., Norwich, England, announced that his company will establish a plant at Winnipeg, Man., for the manufacture of earthenware, etc.

The International Light & Mfg. Company of Canada, Ltd., Regina, Sask., has been incorporated with a capital stock of $150,000.

The Sandstone Brick Company, Ltd., Prince Albert, Sask., has been incorporated with a capital stock of $50,000 to manufacture brick, tile, terra cotta, etc.

The Inland Timber & Construction Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $1,000,000 by P. E. Henderson, E. A. Conde, F. E. Taylor, and others, to manufacture lumber, etc.

The International Izene Company, Ltd., Winnipeg, Man., has been incorporated with a capital stock of $500,000 by D. O'Keefe, D. R. O'Neail, S. L. Head, and others, to manufacture polishes, polishing compounds, etc.

The Dominion Grain Commissioner, Ottawa, Ont., is having plans prepared for a reinforced concrete elevator, with a capacity of 1,250,000 bu. to be erected at Vancouver, B. C., at a cost of $800,000.

The Pump & Brass Works, Medicine Hat, Alberta, is making large extensions to its plant. Geo. E. McDonnell is manager.

The Dominion Sanitary Foundry Company, Medicine Hat, Alberta, will continue the construction work on its plant which was started some time ago.

The Maitland Iron Works, Vancouver, B. C., has been taken over by the Fowler Brothers, and will be moved across to the north shore on property controlled by J. P. Fell. Work will be commenced at once on the erection of a new graving dock, and a shipbuilding and repairing plant in connection with the industry.

Fire completely destroyed the mill of the New Ladysmith Company, Nanaimo, B. C. The loss is estimated at $30,000.

The citizens of Dawson, Y. T., recently voted a bond issue of $200,000, to be used in the installation and maintenance of a municipal telephone, water, light and steam-driven power plant.

Government Purchases

WASHINGTON, D. C., July 20, 1914.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, until August 11, schedule 7071, for one universal milling machine, heavy type, of 35 x 12 x 22-in. capacity, for Portsmouth.

The general purchasing officer of the Panama Canal, Washington, will receive sealed proposals until 10.30 a. m., August 3, for furnishing centrifugal pumps, etc.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, on July 14, for furnishing material for the navy yard, as follows:

Schedule 6880, Steam Engineering

Class 12, Mare Island—One lathe with extras and spares—Postponed indefinitely.

Schedule 6881—Steam Engineering

Class 13, Brooklyn—Fire-room hoist engine; A, duty paid; B, duty free—Bid 7, A $1689.75; 114, A $1750; 176, A, informal.

Schedule 6919, Yards and Docks

Class 91, Norfolk—One hot water meter—Bid 21, $385; bid 29, $584; bid 122, $584; bid 168, $660.

Class 92, Norfolk—One pump—Bid 1, $765; bid 32, $706 and $560; bid 52, $585 and $602; bid 66, $656; bid 87, $585; bid 137, $498; bid 205, $554 and $593; bid 240, informal; bid 281, $585.

Schedule 6920, Navigation

Class 101, Annapolis—Three engine lathes—Bid 3, $741.40; bid 26, $775; bid 96, $465.22; bid 131, $728; bid 137, $638.20, $700, $500 and $638.20; bid 173, $835, $515 and $950; bid 179, $650; bid 183, $685; bid 214, $571 and $639; bid 231, $679; bid 252, $655; bid $269, $655.

Schedule 6942, Ordnance

Class 161, Washington—One plain self-contained grinding machine—Bid 93, $4600; 137, $4700; 214, $4831 and $4827.

Class 162, Washington—Two bench milling machines—Bid 137, $274.50; 179, $160; 218, $371; 238, $235.80.

Bids were received by the chief of the Bureau of Yards and Docks, Navy Department, Washington, July 11, for boilers and accessories at the naval hospital, Las Animas, Colo., as follows:

Item one, work complete; two, boilers and accessories; three, flue, fan and motor, piping, etc.; four, work complete under bidder's specifications, $15,020.

Bid 20, item one, $17,066; item two, $15,020; bid 135, item two, $11,285; bid 233, item four, valves only, $96.00; bid 27, item three, $1912; bid 126, item one, $13,400.

The following bids were received by the commissioners of the District of Columbia, Washington, July 14, for furnishing and delivering electrically operated centrifugal sewage pumps for use in the sewer department:

Item one, pumps only; two, pumps and motors.

Bid 78, item one, $2630; item two, $5195; bid 137, item one, $1074, 55 days; bid 205, item one, $3095; item two, $5132, 90 days; bid 177, item one, $1050, 60 days; bid 66, item one, $2090; item two, $3590, 90 days; bid 125, item one, $1935; item two, $3063; bid 46, item one, $1000; item two, $4109, 100 days; bid 8, item one, $1968; item two, $3592, 85 days; bid 88, item two, $3519, 100 days; bid 61, item one, $2150; item two, $3800, 90 days; bid 80, item one, $2181; item two, $3978.

The following bids were received by the chief of the Bureau of Yards and Docks, Navy Department, Washington, for aftercooler and accessories for the U. S. navy yard, Portsmouth, N. H.:

Item one, aftercooler, accessories, and piping, complete; two, same, f.o.b. cars, Portsmouth, N. H.; three, same as item one on bidder's specifications.

Bid 281, item one, $3087; item two, $2770; bid 86, item one, $3491; bid 228, item one, $2921; item one, alternate, delivery four months, $2846; item 2, $2040; bid 130, item two, $2147; item three, $3224.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

1, Alberger Pump & Condenser Company; 3, Aumen Machinery Company; 7, American Engineering Company; 8, American Well Works; 20 Babcock & Wilcox Company; 21, F. A. Branda & Co.; 26, Bradford Machine Tool Company; 27, The Best Mfg. Company; 29, Builder' Iron Foundry; 32, Blackall & Baldwin Company; 46, Carroll Electric Company; 52, A. S. Cameron Steam Pump Works; 61, DeLaval Steam Turbine Company, 66, D'Olier Centrifugal Pump & Machine Company; 80, Epping-Carpenter Pump Company; 86, Evans-Almirall & Co.; 87, Earle Gear & Machine Company; 88, Fairbanks, Morse & Co.; 93, Walter S. Foster; 96, Federal Sales & Service Company; 114, Hyde Windlass Company; 122, Honolulu Iron Works Company; 125, International Steam Pump Company; 126, Industrial Heating & Engineering Company; 130, Jarvis Engineering Company; 131, I. H. Johnson, Jr. Company; 135, E. Keeler Company; 137, Kemp Machinery Company; 168, A. H. McCay; 173, Manning, Maxwell & Moore; 176, Meade-Morrison Mfg. Company; 177, Morris Machine Works; 179, D. Nast Machinery Company; 183, Niles-Bement-Pond Company; 205, Providence Engineering Works; 214, Prentiss Tool & Supply Company; 218, Pratt & Whitney Company; 228, Rideout, Chandler & Joyce; 231, Ratan-Larmon Company; 233, Joseph F. Schiller; 238, Stark Tool Company; 240, Sterrett & Fleming; 252, Springfield Machine Tool Company; 268, Whitcomb-Blaisdell Machine Tool Company; 281, Henry R. Worthington.

Judicial Decisions

ABSTRACTED BY A. L. H. STREET

RIGHT TO NOTIFY CUSTOMERS OF PATENT INFRINGEMENT.—It is within the discretion of a judge to refuse to grant a preliminary injunction to restrain a manufacturer from notifying a competitor's customers of its claim that the latter's product infringes the former's patent, when it does not appear that such notice is not being given in good faith, or that it is false or malicious, or intended to destroy the competitor's business, and where the former has brought suit to test the question of infringement. (United States Circuit Court of Appeals, Third Circuit, Clip Bar Mfg. Company vs. Steel Protected Concrete Company, 213 Federal Reporter 223.)

NOISE PRODUCED BY MACHINERY AS NUISANCE.—One who occupies a building as a combined dwelling-house and store will not be permitted to enjoin operation of a nearby industrial plant on account of the noise produced in operating the same in a reasonable manner, where he consented to the erection of the plant. "In determining whether its operation is a nuisance on account of the noise and its proximity to the house, it is proper to consider the expense and inconvenience to defendants to move it, and compare their trouble and expense with the annoyance and inconvenience to plaintiff. But, if it is practicable to lessen the noise at a reasonable cost, defendants ought to be required to do it." (West Virginia Supreme Court of Appeals, Brokaw vs. Carson, 81 Southeastern Reporter 1133.)

AGREEMENT NOT TO RE-ENGAGE IN BUSINESS VALID.—A person who owns stock in a business corporation on selling it may validly bind himself not to engage in the same business for a period of five years, as a competitor of the corporation, either on his own behalf or as an employee. (Georgia Supreme Court, Holtman vs. Knowles, 81 Southeastern Reporter 852.)

DAMAGES FOR BREAKING SCRAP-IRON PURCHASE CONTRACT.—On breach of a contract to purchase and remove scrap iron, etc., from a wrecked building, the seller is not only entitled to recover the excess of the contract price above the market value of the materials but also the cost of removing them from the premises. (Kentucky Court of Appeals, Louis P. Hyman & Co. vs. H. H. Snyder Company, 167 Southwestern Reporter 146.)

CHARACTER OF MACHINERY AS REAL ESTATE OR PERSONALTY.—In order that machinery installed in a building may become a part of the real estate, so as to be subject to a mortgage of the land as against a subsequent mortgage of the machinery as chattels, it must be actually annexed to the real estate, with an intention to make it a permanent part of the land. (New Jersey Court of Chancery, Chancellor of State of New Jersey vs. Cruse, 90 Atlantic Reporter 673.) In holding that certain machinery was subject to a real estate mortgage, the court said in this case: "The building in which the machinery and appliances were contained was used by the mortgagor as an engineering and machine shop and factory for the fabrication of iron and steel materials and construction work. The articles in question were installed by the mortgagor and were used by him in the carrying on of that business on the mortgaged premises, and for that purpose were affixed to the ground and building. They were removable without injury to the real estate, but this circumstance is of little moment. They were integral parts of a common plant and, with the building, formed a unit for the prosecution of a common purpose. Undoubtedly they were intended by the mortgagor to remain indefinitely, and were designed by him to be not a temporary, but a permanent, accession to the freehold."

WARRANTY OF MACHINES SOLD.—A special warranty of a machine sold excludes any implied warranty on the same point. Where the buyers of a machine retained and used it for several months without complaint as to its efficiency, they lost all right to claim that it did not come up to the warranty under which it was sold, if the following condition was attached to the warranty: "Should we (purchasers) be unable to make the machine work according to warranty, we agree to write the company, fully explaining in what way the work is not according to warranty, and we further agree to hold the machine, and take good care of it, until the company instructs us in its operation, or, if they deem it advisable, sends a representative to make a demonstration. Failure to notify the company within 10 days after receipt of machine shall be an acknowledgment that the machine does the work according to warranty." (Missouri Court of Appeals, Brooks Tire Machine Company vs. Wells, 167 Southwestern Reporter 604.)

SALE OF SCRAP-IRON.—Under a contract to sell all the "scrap iron" remaining on premises after a fire, the purchaser was not entitled to any material which could be repaired. (Michigan Supreme Court, Northwestern Cooperage & Lumber Co. vs. Rubinsky, 147 Northwestern Reporter, 456.)

PARTNER'S LIABILITY TO FIRM.—One member of a partnership must act in the utmost good faith toward his copartners, and, if he purchases property for his individual benefit when the firm itself is entitled to the advantage of such purchase, or secures a valuable contract for himself which it was his duty to obtain for the firm, he will be treated as a trustee for the firm with reference to the transaction, and be compelled to account to his copartners for the profits acquired by reason thereof. (Washington Supreme Court, Schrader vs. Downing, 140 Pacific Reporter, 558.)

EMPLOYER'S RESPONSIBILITY FOR NEGLIGENCE.—An employer is liable for injury to a workman on the ground of negligence only when the negligence directly results in or concurs in producing the injury. (Iowa Supreme Court, Chown vs. Lennox Furnace Company, 147 Northwestern Reporter, 144.)

QUANTITY CALLED FOR BY CONTRACT OF SALE.—A contract for the sale of not less than 2000 tons of a commodity, and not more than 3000 tons, does not bind the buyer absolutely to take more than 2000 tons. (New Jersey Supreme Court, E. I. du Pont, de Nemours Powder Company vs. United Zinc & Chemical Company, 89 Atlantic Reporter 992.)

INFRINGEMENT OF TRADEMARKS.—Use of the word Havoline to designate lubricating oils does not infringe a tradename Valvoline, especially where there has been no imitation of packages or other attempt to deceive the public to the prejudice of the producer of the latter brand. An owner of a trademark loses the right to relief against its infringement by delaying suit for several years, with knowledge of the existence of the infringement and that his competitor is expending large sums of money in advertising the infringing brand. (United States District Court, Southern District of New York, Valvoline Oil Company vs. Havoline Oil Company, 211 Federal Reporter, 189.)

STRUCTURAL STEEL CONTROVERSY.—Plaintiff, having a contract to erect a building by a certain date, defendant agreed to furnish a quantity of structural steel at a specified price. Delivery was to be made within eight or ten weeks after plaintiff should furnish information necessary for the shop plans. Held that defendant was not entitled to have such information furnished immediately upon the making of the contract, so as to secure the advantage of existing market conditions; it being sufficient that plaintiff furnish the information in time to enable defendant to have the maximum length of time called for by the contract before completion of the building in which to make delivery. But, on defendant's failure to make delivery within the time required by the contract, plaintiff is not entitled to recover the excess of the price which he paid elsewhere for the necessary steel over the price at which defendant agreed to furnish it, if the amount so paid was in excess of the market price of the material; the damages recoverable must be limited to the excess of the market price above the agreed price. (Michigan Supreme Court, Sauer vs. McClintic-Marshall Company, 146 Northwestern Reporter 422.)

Trade Publications

Forging Machines.—National Machinery Company, Tiffin, Ohio. Circular. Is the fourth of a series of talks on the design of a forging machine, and points out how a large die opening effects economy in the use of these machines. A drawing showing the top of one of the company's heavy pattern forging machines with the dies in the open position is given, as well as a small sketch showing what is meant by the term die opening.

Return Trap.—Lytton Mfg. Company, Franklin, Va. Pamphlet. Illustrates and describes a vacuum lifting return trap, which is automatic in its action and has no trunnions or stuffing boxes to pack, stick, leak or break the vacuum. The floating piston used is of special design, which permits a float of greater buoyancy to be employed than would be possible if it had to withstand the external pressure of the live steam required for discharging. A brief outline of the method of operation is presented and a table of specifications for the trap, which is built in nine sizes, is included.

Scrap Baling Presses.—Logemann Bros. Company, Milwaukee, Wis. Bulletins Nos. 90, 91 and 92. Point out the advantages of using a line of hydraulic scrap metal bundling presses, which were illustrated in *The Iron Age*, April 9, 1914. Each of the bulletins deals with a different size of press. The construction of these presses varies slightly in the several sizes, and illustrations are presented of the three different styles, together with data on the size of cabbage produced by them.

Automatic Exit Doors.—C. B. Woodard, Springfield, Tenn. Two pamphlets. Call attention to an automatic safety exit door for use in factories, which, while unlocked on the inside, is nevertheless locked to prevent the entrance of unauthorized persons during working hours. The particular advantage of this door is that it is unnecessary to apply pressure at any one spot to open it from the inside and after the door has been opened it is unnecessary to rearrange any portion of the locking mechanism to bar people from entering.

Speed Regulators.—Allen-Bradley Company, 495 Clinton street, Milwaukee, Wis. Bulletin No. B-571. Describes briefly the type CR speed regulator for reducing the speed of slipring motors employed for driving fans, machine tools and similar machinery. The special features claimed for the device, the units of which are of the maker's carbon compression type, are compactness, overload capacity and an infinite speed adjustment, the last being obtained by turning a handwheel, which compresses the carbon disks forming the resistance unit.

Milling Machines.—R. K. LeBlond Machine Tool Company, Cincinnati, Ohio. Paper bound book. Size, 6 x 9 in.; pages, 220. Is a treatise on milling machine practice, and is an analysis of the essentials of a modern knee type milling machine from the standpoint of the practical mechanic. It covers the construction of the company's machines, and contains instructive data on a typical class of commercial milling operations, as well as several examples of toolroom practice. The construction of the machines is gone into at considerable length, the text being supplemented by numerous halftone and line engravings. In connection with the special milling machine operations that are covered, views are presented of the machine arranged to do the work, and a number of tables showing the arrangement of gears to be used are included.

Drinking Water Systems.—Armstrong Cork & Insulation Company, Pittsburgh, Pa. Pamphlet. Mentions the requirements of an ideal drinking water system, together with the different methods that have been employed. The various questions to be considered in connection with the installation of refrigerated drinking water systems are taken up and briefly discussed, followed by data on the company's Nonpareil cork covering. A number of illustrations of places where the covering is installed are presented, together with a partial list of installations. The design of a typical drinking water system was gone into at some length, with specifications for the insulation of the pipe lines.

Air Compressors.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-N. Describes a line of steam and power driven inclosed air compressors for industrial use. The construction of the compressors is gone into at some length, the text being supplemented by a number of halftone engravings, followed by illustrations, with specification tables of the different types in which it is built.

Inclinable Open Back Presses.—Consolidated Press & Tool Company, Hastings, Mich. Catalogue No. 10. Refers to a line of open back inclinable presses which are built in a number of different styles and sizes. A brief description of some of the special features of the press, such as an automatic safety clutch, a pin clutch and a compensating ball joint connection, is given, followed by a brief account of the construction of the presses, with a table of specifications. In addition there are some 50 pages of illustrations of the different presses, which are equipped for belt and motor drives, the power in the latter case being transmitted either directly through gearing or by a belt from a motor mounted on the side of the press.

Iron Cement.—Smooth-On Mfg. Company, 572 Communipaw avenue, Jersey City, N. J. Instruction book No. 7. Devoted entirely to the use of the company's No. 7 cement for hardening, water proofing and oil proofing concrete. This cement is a hydraulic chemical iron cement, and can be used for stopping leaks in concrete and for binding concrete to concrete and brick to brick or to any porous surface. Illustrations of a few of the many ways in which the cement has been used are presented.

Safety Set Screws.—Bristol Company, Waterbury, Conn. Bulletin No. 801. Illustrations and descriptive matter explain briefly the use of a line of hollow safety set screws, having a series of dovetail flutes on the interior. These screws, which were illustrated in *The Iron Age*, April 9, 1914, are made in a number of different sizes and brief specifications of them are given. An illustration showing the different sizes and a partial list of users are included.

Concrete Coal Bins.—Brown Hoisting Machinery Company, Cleveland, Ohio. Catalogue S-1914. Gives general description and specifications for a line of suspended concrete bins for coal, which consist of two horizontal steel plate girders, from which the bin construction is suspended. The bins proper are made of Ferroinclave sheets, which are bolted to straps fastened to the girders and covered with concrete to give a smooth inner surface. Views of a number of plants in which these bins have been installed are given, together with engravings of cranes and other hoisting and conveying mechanisms that are used in conjunction with the bins.

Hand Punches and Shears.—Whitney Metal Tool Company, Rockford, Ill. Two circulars. The first shows a line of hand-operated punches and shears for sheet metal work. One of the special features of the punch, which is equipped with ball bearings, is that it can be very easily taken apart. The shear can be readily folded to about half its length to facilitate packing in a chest or tool kit. The other circular contains a number of illustrations and a brief description of a ball bearing punch which is designed to be mounted on a bench or beam, although it can also be removed from the base and held in a vise for use as a bench tool or in the field in any position.

Automatic Fire Escape.—Davy Automatic Fire Escape Company, Syracuse, N. Y. Pamphlet. Treats of an automatic fire escape which is designed for the rapid lowering of people from the upper floors of buildings. The lowering is accomplished by a steel wire cable passing over a sheave wheel, which is controlled by an automatic brake operated by centrifugal force. Views of a number of tests that have been made of the fire escape are given, and a partial list of users is included.

Automatic Stoker.—Rosedale Foundry & Machine Company, Pittsburgh, Pa. Bulletin B. Shows a special type of automatic chain grate stoker which is designed to operate continuously under severe conditions. The special features of the stoker are high efficiency, capacity to develop and maintain heavy overloads without hand stoking, minimum labor for operation, low cost of maintenance and smokeless combustion. A description of the operation of the stoker is given, the text being supplemented by a number of engravings of the different parts. Sketches showing typical installations with various types of boilers and views of a number of actual installations are included.

Metal Working Machinery.—Rowbottom Machine Company, Waterbury, Conn. Six bulletins. Four of these deal with a line of grinding machines which are built in the double end disk type, both with and without exhausters, a ball-bearing combination disk machine with exhauster and disk and surface machines. Illustrations and brief descriptions are presented of each of the lines, and condensed specification tables are included. Bulletin No. 101 presents illustrations, a brief description and condensed specification tables of a line of foot and power presses for use on benches and tables. The other bulletin, No. 102, is concerned with a special cam milling machine, which, as the name indicates, will cut all styles of cams in general use. Views of the machine are given, together with some of the products. An illustrated description of this machine appeared in *The Iron Age*, March 5, 1914.

Coal and Ash Handling and Storage.—Guarantee Construction Company, 140 Cedar street, New York City. Bulletin No. 101. Describes briefly a number of installations for the economical handling and storage of coal, ashes and other materials, and shows some examples of industrial and power plant construction. Special reference is made to the Darley suction conveyor for handling ashes and various types of hoisting and conveying machinery. In addition to views of the plants, there are a number of diagrams showing the arrangement of the apparatus.